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THE SCOTTISH GEOGRAPHICAL MAGAZINE

THE SCOTTISH GEOGRAPHICAL MAGAZINE

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PROFESSOR JAMES GEIKIE, LL.D., D.C.L., F.R.S., HON. EDITOR
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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

ANNIVERSARY ADDRESS.

(*Delivered at Edinburgh, 28th November* 1890.)

RIVERS, PLAINS, AND MOUNTAINS.

By E. G. Ravenstein, F.R.G.S.,

Honorary Fellow, Royal Scottish Geographical Society.

Instead of discussing some startling discovery, speculative hypothesis, or dry statistics, my intention to-night is to deal with a branch of geography that should interest us all—the department of Political Geography. Since the days of Strabo and Ritter we have had a good deal of speculative theorising in this department of knowledge, and in more recent times the names of Peschel and Ratzel are familiar to us in this respect. These speculations being based upon facts, it behoves us occasionally to consider them seriously. We are frequently told that man is the creature of circumstances, or at least of his surroundings, and that, knowing the configuration of a country, its climate and its products, we should be able to determine what manner of people must inhabit that country. This is, of course, a hasty conclusion, though it contains the fraction of truth that is found in most statements of the kind.

The motive of my lecture is to examine some of the more prominent physical features of the world in their effect upon the destinies of man and of nations.

We will commence with rivers—in many countries a life-giving element, and everywhere one of the leading factors of human progress. But there are rivers and rivers, just as there are Scotsmen and Scotsmen: we must observe a distinction. Some rivers there are which amply fulfil all promises, while others, though they figure more prominently on the map, are but of little use. Take, to begin with, the rivers of the

Temperate regions, rivers with which we are most familiar. If they conduct to a navigable sea, or open their mouths towards a country that is prepared to receive the products of human industry, it follows that they must become seats of human activity, and, inferentially, of prosperity. There are such rivers even in a small country like Scotland: the Clyde, for example. The mouth of the Clyde is kept open, not only through the energy of municipal councillors, but also by the action of Nature. The Clyde not only faces Ireland, but also that New World, the discovery and development of which placed Great Britain in the very centre of the inhabited globe. It is a river which, though small, is important. Now, contrast the Clyde with those magnificent rivers you see on the map—say in Siberia, where they flow to waste in an ice-clad ocean. The lower Clyde is open throughout the year, but those Siberian rivers are available for local purposes only, and even that only during a brief period of the year. . Even the Amur, which at one time it was hoped could be used as an outlet from the Siberian tracts into the Pacific, is covered with ice during the greater part of the year. It can never serve the purposes of a first-rate highway; and, in consequence, the Russians have been forced to seek a port further south, at Vladivostok. To communicate with the outside world at all times, they are therefore compelled to go by road or rail.

There are rivers which, though they may not communicate with the open ocean, offer considerable facilities as navigable highways. Of such is the Volga. Such rivers, draining inland basins, are not of as great human importance as those conducting to the ocean by a direct route.

Leaving the Temperate regions and entering the Tropical zone, we encounter rivers that are serviceable as highways during one-half of the year, but are useless during the other half, owing to their becoming either entirely dry or greatly reduced in volume. As the sun, in his apparent path through space, travels north and south, so will the rivers dry up or flow abundantly. It is not ice, but the absence of water, which in their case obstructs navigation and renders them less useful to man than they might otherwise be. There are, of course, exceptions even among such rivers as these. In the case of mighty rivers like the Amazons and Congo, fed by northern and southern tributaries, and flowing east and west respectively, in proximity to the Equator, the heavy rains which follow in the apparent path of the sun will always keep the parent streams well fed through their tributary branches. Thus the Amazons and Congo are pre-eminent among Tropical rivers.

Cataracts form another insuperable obstruction to the free navigation of rivers. In Great Britain, of course, they need not be taken into account. Our waterfalls are in some respects notable; but I know of no waterfalls in the British Isles that may be said to obstruct navigation. If, however, we go to Africa, the physical configuration of which is productive in a marked degree of such obstructions to river-navigation as waterfalls and rapids, you will find that they are among the chief hindrances to free fluvial access from the ocean into the Interior. If we were to draw a line on the map through all the cataracts that form the first obstruction, it would at once be seen how near to the coasts such

obstructions have been raised by Nature. It is, indeed, a remarkable fact that, while the rivers of Europe, and many of Asia and the Americas, give access into the very heart of those continents, the rivers of Africa oppose natural obstructions that compel one to stop at their very threshold and to continue the journey on land.

When rivers flow through broad plains and open valleys, they invite a dense population. Towns spring up along their banks; and with the aggregation of human beings ensues the natural development of intellectual and moral faculties: man is taught to feel that there is such a thing as a common humanity, for such a feeling can only arise from the association of mind with mind.

I have referred to the Clyde. It is not necessary for us to travel further, in our imagination, to other rivers presenting similar features. Wherever there are open, navigable rivers, draining regions not devoid of natural resources, there the centres of our densest populations inevitably occur.

Now, let us consider rivers as political boundaries. To a superficial observer it might appear that a river was the most effective of such boundaries. We often speak of natural boundaries, as distinguished from conventional frontiers. If natural boundaries must be formed by natural obstacles, such as rivers and mountains afford, then the term is no doubt applied accurately. But if we intend to convey the notion that they are boundaries freely accepted by a free people, or by nations whose development is unfettered, then the application is a false one. Doubtless rivers constitute a good line of defence; but, fortunately, war is no longer the chronic state of neighbouring nations. Rivers certainly do not separate nations, except in rare cases, such as in thinly peopled countries. Where rivers flow through steppe-countries, inhabited only by nomads and their herds, it may occur that the grazing districts find a natural boundary in the river. But in the case of rivers flowing through broad valleys, or through fertile plains, they unite rather than dissociate the populations. No important town springs up on any river without its twin town appearing on the opposite bank, both being united by the closest ties. The inhabitants of such towns usually speak the same language, exceptions to this rule being very rare. All along both banks of the Rhine, excepting only in the highest valleys of the Alps, one German dialect succeeds the other, until the river loses itself in the Netherlands among the Dutch. The only notable exception in Europe that occurs to me is that of the Lower Danube. On its northern shore are the Rumanians, and on its southern the Bulgarians. But the Danube that separates these peoples is so broad that it resembles a sea, and is bounded, moreover, on its northern side by repellent steppes. It is being bridged over now, but communications in former times had to be maintained by ferries. Rivers, in fact, are not good national boundaries; and it speaks ill for the geographical instincts of our diplomatists that, in the recent boundary arrangements in Africa, so many rivers should have been selected. Some of these rivers, like the Tana, run right through the territories of tribes which dwell on both its banks, just as the Lower Nile passes through the same country. And as, on the Lower Nile, both banks of the river

form one country, so on the Tana both banks form one country. Nevertheless, it was proposed that the Tana should form the boundary between two European colonies. Elsewhere in Africa the same mistake has been made: what Nature intended should be united has been ignorantly torn asunder by man—as far as man can tear things asunder.

From the consideration of rivers we may turn to plains, and more especially to the lowlands. As in the case of rivers, so in lowlands, the subject presents itself under certain distinct aspects, dependent, in the main, on climatic phenomena. Among plains, the most extensive areas are occupied by what are known as steppe regions, or regions with an rain-supply insufficient to support vegetation the whole year round. The steppe-countries occupy an enormous area, and occur also in a good many Tropical regions. The conditions under which man lives in steppe-countries are, of course, quite different from those he enjoys on fertile plains. The poverty of their natural resources, which can only support a thin population, compels the people to scatter, and is inimical to all political cohesion. Towns, and even villages, are nowhere found: the people are nomadic, and wander from one grazing ground to another; their life is unsettled; they acquire no property that is not convertible or transportable; and they build no houses. These nomads are homeless,—if, indeed, the steppe is not their home.

Under such circumstances, migration is most active in the steppe-countries. Year by year hundreds of individuals leave the steppe in search of more favoured lands; under exceptional circumstances, such as drought, they even leave their homes in large and compact numbers; and then they become invaders, seizing the wealth of others who have been more favoured by Nature. History presents many examples of such forced migrations, when, like a cloud of locusts, hordes of men have passed from the forbidding steppe-regions, that once was their home, into the fertile plains of Europe. Only from lack of numbers have they, on such occasions, been thwarted of any permanent results from the victories of their arms, which, nevertheless, have arrested civilisation for a time. Europe has been saved from these disasters by reason of its denser populations in the fertile regions thus open to attack. The invaders have either been repulsed or assimilated.

From the steppe to the desert is only a step. If the former raises a barrier between nation and nation, how much more effective in this respect must be the latter! Witness the barrier raised by the Sahara between the Mediterranean shores of Africa and the Sudan! By how many centuries has the civilisation of Central Africa been thereby retarded? Communications through the desert, which are maintained only fitfully and at great hazard by small bands of Arabs, are at all times most difficult. We thus see, by quoting an extreme case like that of the Sahara, how deserts can raise an almost insurmountable barrier to the assimilation of peoples.

It is to the fertile plains we must look for the birth of great cities. Immigrants from various countries have there become assimilated with the indigenous people, and have helped to build up great nations. Out of these nuclei empires have grown, in modern as in ancient times. Consider,

for instance, the process of assimilation going on at this day in the extensive lowlands of Russia. Judged by its physical features, Russia is monotonous in the extreme; and, just as in a diversified country it is natural there should exist diversity of conditions producing one harmonious whole, so in vast regions like Russia we have uniformity. If the Ural Mountains had formed a real barrier, separating country from country, as the Himalaya separate Northern Asia from parts of Southern Asia, how different might have been the fate of Siberia! How long might Siberia have had to wait until the Russians advanced into its inhospitable plains? But, as it was, it took only one hundred years for the Russians to traverse the thinly-peopled lands intervening between the Ural Mountains and the Pacific Ocean. Such rapid progress would have been impossible had the region been broken up by high mountains or occupied by dense inimical populations: but the country is uniformly level and sparsely inhabited.

In other countries, too, we observe the influence of plains on the distribution and fortunes of the populations inhabiting them. Look at Scotland. The most extensive level tract has become the centre of the densest population, and the theatre of the highest human activities. Many causes have contributed to these results; but the primary cause is, no doubt, that the greatest extent of available land in the country is able to support the densest population. Look at Germany. How is it that some parts of Germany are divided among numerous States, while in the North we observe the reverse of these political conditions? Is this not primarily the result of the diverse, as against the uniform, physical embossment of various parts of Germany? It was inevitable that the greatest State of Germany should spring up in the northern plains, across which you can drive a coach-and-four from end to end, from the borders of France to the borders of Poland. Regions like this are destined to be the homes of great States, their physical uniformity encouraging uniform political institutions.

Such examples might be multiplied indefinitely. We might point to India, to the immense plain lying to the south of the Himalaya; to Italy, to the fertile plain of Lombardy watered by the river Po: and the comparison I have drawn would in both cases be substantiated. Wherever you find a plain that is favourably situated, well watered by navigable rivers, and yielding products capable of supporting a large population, there you also find a dense and thriving population—a nucleus of progressive political institutions.

From plains we may proceed to consider mountains, in their effect upon the welfare and progress of human institutions and industries. It is natural that in mountainous countries we should find political conditions to be the very reverse of those in the plains—diversity as against uniformity. Mountains and plateaus play very important parts in the political geography of the world, as you know. I have only to instance the familiar example of the Alps in order to bring this home to you. Crossing the Alps from north to south, it is impossible to avoid the impression that one is passing into a totally different country from that which is left behind. One feels that an everlasting barrier between

country and country, nation and nation, has been passed. In England, too, we may find instances of the kind, if somewhat more restricted in their effect. On a smaller scale, the mountains of England are equally the cause of diversity among the inhabitants.

Another very important fact is the distinction to be observed between mountains running north and south and those trending east and west. In America we see this distinction drawn on a large scale, demonstrating the relative effect, not only on the fauna and flora of countries, but also on the populations inhabiting them. It is needless to enlarge upon this obvious distinction, for which climatic phenomena are largely responsible. Whereas latitudinal mountain chains and table-lands are among the most formidable barriers in nature, highlands stretching in the direction of a meridian present fewer obstacles, and frequently even help the amalgamation between north and south.

We see, then, how mountains separate small communities, whereas plains unite them. Mountains create diversity and plains encourage uniformity. Need I, speaking in "Modern Athens," adduce Greece as an example? Look at the small cities in Greece. And in other parts of Europe we observe corresponding phenomena. The Balkan Peninsula, for instance, is a striking example, in the effect which its mountainous character has had in keeping the populations apart. In Switzerland, too, we have seen canton growing up by the side of canton, but not amalgamating—canton warring against canton; in brief, a country under the conditions of a parochial life. In Afghanistan—to turn to Asia—we find similar conditions at work: physical barriers have been more potent than kinship. In some valleys the people will hold together and regard themselves as members of the same clan, irrespective of the languages they may speak. Even in the Scottish Highlands we observe much the same phenomena. There was a time when every Scottish chief regarded himself as a sovereign. Only after the Lowlands grew more powerful were these diverse political relations in the Highlands finally broken down, when the people were brought into the common system that now embraces the whole of the country.

But even mountain regions are not without natural centres of population. For instance, in Switzerland, the "Lake of the Four Cantons" and the enclosing mountains have had this effect. In every nook and corner of the shores, where a valley opens out upon the lake, we find villages and little towns. The lake is a common meeting-place for them all, and offers a ready means of inter-communication. At the foot of the lake the large town of Luzern acts as an intermediary between the outside world—with which it is connected by railway—and the communities on its shores, whose activities are thus focussed by the largest town. It was but natural, and not an accident of history, that the people of the "Four Cantons" dwelling on the shores of this lake should have been the first to unite in a political bond—a bond which has now assumed larger proportions by accretion. Much the same conditions have prevailed in parts of Scotland. If you follow, in the orographical map before you, the valleys as they converge upon certain centres, you will at once recognise the fact that such centres—Perth, Dunkeld, and

Inverness, for instance—are not mere accidents, and have not been created at the bidding of one man: they are the natural result of geographical condition. Where towns have been created in defiance of the natural configuration of the land, they have passed away. As long as there are people contented to remain in the Highlands of Scotland —which, I dare say, there will be for some time to come—so long will places like Perth, Inverness, and Dunkeld remain places of local importance.

Now to what does this isolation in mountain-valleys tend? It encourages the survival of old customs and old influences, and it preserves decaying languages and dialects, among other things. The Highlands of Scotland, for instance, are as an island, on which such survivals are still nourished, although an ocean of English-speaking people surrounds it. And just as the waves of the ocean beat upon the rugged shores, so do the waves of English speech break upon the strongholds of Gaelic in Scotland. The sea-coasts are eroded: and here and there in the Highlands do we observe a similar erosion in the speech, and manners, and customs of the people.

As regards assimilation, we have seen that it was rapid enough in the plains, but in highland regions it is very much slower. In Ireland, if you wish to hear Irish spoken, you must go to the western hills. You will even find, lying towards the east like an island, a district in the Mourne Mountains where the old language is not yet dead. But the broad valley that connects the Ireland of the Scots with the Ireland of the English round Dublin—which, not fifty years ago, was inhabited by Gaelic-speaking people—has now become absolutely English, as far as language can make an Irishman anything but an Irishman.

It is obvious that the conservative influences of highland regions must tend to maintain old customs and superstitions no less than a closer bond of family relationship. The people of mountainous districts, too, are the last to sacrifice their independence. But independence is not always freedom. The old-fashioned Swiss, or the tribes that were expelled from the Russian Caucasus, regarded as freedom what we should term, at best, parochial home-rule.

In many respects the influence of mountains and of steppes upon their inhabitants is very much the same. The resources of a mountain region are limited, as are those of the steppes. Man's activity is therefore called into play, in order to overcome the natural obstacles to his personal advancement, more frequently than is the case in fertile lowlands. The conditions of his life call forth an exertion of his mental faculties, the exercise of which is beneficial to him, physically and morally. The mountains, after all, can only support a limited number of inhabitants, who congregate in the most fertile districts, or emigrate to others, thus bringing about a healthy flux and efflux. Mountain people also descend to the lowlands, thus introducing into their new spheres of life a vigorous strain of physical superiority which, in return, is probably met by a higher mental culture. This constant infusion of new life necessarily tends to maintain a high standard; for, after all, our mental faculties become worn out in time, unless sustained and invigorated by

physical development. The hard training of a mountain people is a very wholesome one for success in the lowlands. They make, too, the best colonisers.

In the Tropical parts of the world, the relation between the dwellers on the plateaus and the lowlanders is different from that prevailing in Temperate regions, such as we have been considering. The inhabitants of mountainous regions in the Tropics, breathing a purer air, and leading a healthier life, are nearly everywhere superior. The enervating climate of the lowlands saps the strength of the people whose lot is cast therein. I am not one of those who assert, in face of the indisputable facts to the contrary, that we Europeans can colonise Tropical lands; but, of course, if we are compelled to go to them, then life on a high plateau is preferable to life in the lowlands, because the climate there approximates more closely to our own. In Tropical America native civilisation had its birth in the highlands, and not in the plains—in Mexico and Peru, and not in the low-lying regions of the Amazons. In Africa, too, we are told, by travellers who observe carefully, that the inhabitants of the Interior are superior in every way to those of the Coastal regions. The latter have, of course, been corrupted by Europeans; but, in the first instance, their life in the unhealthy coastal zone must have had an enervating effect upon them. The only native empires that Tropical Africa has ever known have been those which sprang up in the healthier highland regions. For Africa, they were really powerful. We know, too, from Portuguese narratives, that it was the inland tribes which pressed to the coasts, overcoming those settled thereon; nor has this migratory movement altogether ceased at the present day. Thus, the process of regeneration, by the strong supplanting the enervated, is observable in Africa, as elsewhere.

We now pass to a consideration of mountains as political boundaries. They are admittedly more effective in this respect than are rivers, more especially if they happen to be only sparsely inhabited; and I am only speaking now of lofty mountain chains. The further you penetrate into such mountain regions, from either side, the fewer indications you find of human habitation. They might be deserts, as far as their influence on man is concerned, for they are deserted by him. Such mountain barriers form ideal political boundaries, as in the case of the Alps. In Europe, however, the interchange of populations is so great that an overflow is experienced. A very curious instance of this overflow is presented in the Southern Tyrol. You find there a German-speaking population, representing the residue of a great wave of German migration that overflowed towards Italy, and at one time even reached the plains of Lombardy. The Italian people consequently withdrew to their most fertile districts, leaving the less productive mountain valleys to the new-comers. And there they survive, just as the Highlanders survive in Scotland; but, unless strengthened by an accession of numbers, there they will gradually die out; and the boundaries fixed by Nature herself will prevail in the end.

What I have said in regard to mountains, in their influence on the population of a country, does not apply to mountain regions capable of supporting large communities or yielding minerals. If, for instance, in

the Pennine chain of hills, it were not for the deposits of coal found there, the manufacturing districts could not exist. Contrast Bohemia with Hungary. The former was anciently inhabited by a German tribe, who, however, left the country, and were replaced by Slavs. The new arrivals naturally occupied the most favoured regions, in the centre of the country. But, at least on three sides of Bohemia, there dwell Germans, who crossed over the mountains and occupied all that remained. These facts are not recorded in history, perhaps, but they are written on the face of the country, if we read its geographical features aright, and are recorded in census returns. A sufficient proof is afforded by the three dialects of German which are spoken in Bohemia; whilst the Slavs occupy the central region, and speak their mother-tongue. The process of assimilation is retarded by the higher degree of culture possessed by the Germans, and by the support which is afforded them by their compatriots living outside the borders of Bohemia. Now, compare this country with Hungary, which is very differently circumstanced, although the conditions there are apparently the same. We find in Hungary an alien people, the Magyars, who entered the country as conquerors. They occupied the inviting plains in the heart of the country. They, too, are now surrounded by strangers, but these, instead of speaking one and the same language, belong to at least four distinct nationalities. Thus, although the Magyars, or Hungarians proper, are in a minority, whilst the Slavs in Bohemia are in a majority, the chances of the former of eventually imposing their language upon all the inhabitants of the country are greater than the chances of the latter.

We have up to the present regarded only special features; let us now consider them collectively. Countries which possess diversity of physical features enjoy the happiest conditions, by taking advantage of which the highest triumphs of civilisation have been achieved. If, in addition to this diversity of feature, a country is provided with a good system of waterways—is not too much broken up by mountains, or too crippled by endless plains—then the conditions of life in such a country give every opportunity for the exercise of human faculties. Such conditions, however, do not exist in countries that are either highly mountainous, or include only extensive plains. In the case of Scotland, its chief advantage is this same diversity of physical embossment: a fertile plain watered by the Clyde and the Forth, with flanking hills rising into mountains, in the north and in the south. England is even more highly favoured by nature, which largely accounts for its political predominance. In England you find every geological formation in Europe. The relief of the land expresses the utmost diversity of feature, and, although on a small scale, has great beauty of contour. Everything, therefore, is in favour of the development of the British Isles as a great political centre, and of the intellectual progress of its inhabitants, as far as physical environment can encourage such progress.

Let us glance at the United States from the same standpoint. Recall to your minds those prophecies of evil: "Oh, the United States are an impossibility; they must fall to pieces in time. The south is quite different from the north. They are marked out by Nature as

distinct regions, and ought at least to have formed two States." But why? On the face of it, such a statement is absurd. There is no country laid out on broader lines than the United States. You have the broad valley of the Mississippi between the Rockies and the Alleghanies, uniting almost the whole country. The Alleghany mountains are of moderate elevation, easily crossed, and constitute no barrier between the peoples inhabiting their opposite slopes. They may almost be likened to a rampart, having the Atlantic States for a glacis, and the broad Atlantic for a moat. If, on the Pacific side, the physical conditions are less favourable to political unity, they are not so unfavourable as to present insuperable obstacles to the enterprise of man. Whatever may be said of California as a distinct region, the United States east of the Rocky Mountains form one great community, and were intended by Nature to be one great State.

One word in conclusion. It must not be supposed, from what I have said, that Nature alone is responsible for the political phenomena I have adduced. Human activity, intelligently directed, is required in order to assist the beneficent action of Nature, or sometimes to control it. We can easily imagine a country, enjoying every physical advantage, and productive in a high degree, yet occupied by a race of men wholly unfitted to develop its resources. But, fortunately for the cause of human progress, such spendthrifts and idlers are threatened by a Nemesis which in time destroys them, unless they amend their ways. The earth has been held, and will continue to be held, only by those who are fitted to make the best of it and its resources. Nature is not everything, nor is man—her greatest triumph—a powerless agent. Man can introduce advantages which Nature has denied to a country. He can build railways where natural highways do not exist. He can construct canals where the navigation of a river is obstructed. He can bring districts that are separated by physical obstacles nearer together by creating and developing mechanical means of communication. Moreover, by his mental activity, man accomplishes the highest results. He diffuses thought by speech and in literature; and this literature unites men who are far apart into nations, and nourishes their highest aspirations after truth. Thus, man is as often the master as he is the creature of circumstances. He may, and he does, daily remove physical obstacles, but some of these are beyond his strength, and remain as landmarks on the face of the earth. Some of these landmarks I have referred to; time only prevents my dealing with others. Political geography being based on physical geography, the student of history, no less than the geographer, is bound to take account of the latter in order to appreciate or understand the former.

OUR COMMERCIAL RELATIONS WITH CHINA.

(Read at Meetings of Society, Edinburgh and Glasgow, December 1890.)

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Our commercial relations with China are of such deep importance to us as a nation that I need not offer any apology for bringing the subject before you this evening. They have extended over nearly three centuries with varying fortunes; they now represent an annual value of many millions sterling, and they possess the potentiality of almost unlimited extension in the future.

In dealing with this subject on the present occasion I propose to follow on the lines I have just indicated, and to divide my lecture, like an old-fashioned sermon, into three heads. I wish to speak first of the history of our trade with China; secondly, of our present relations with that country; and thirdly, of the prospect which lies before us in the Flowery Land.

The antiquity of the Chinese is so infinitely greater than any of which we can boast, that it need not surprise us to hear that many centuries before we existed as a nation their merchants were familiar figures in the bazaars of western Asia, and that their porcelains and silken goods were common objects in the markets of eastern and southern Europe. As early as the beginning of our era the fame of the wealth and power of China had spread throughout the Old World, and in the second century Marcus Aurelius thought it not beneath his dignity to send an embassy to the ruling emperor. Both by sea and land Chinese travellers penetrated into the west, and their early presence in Egypt was attested not many years ago by the discovery of some China porcelain bottles in mummy-containing tombs. Probably these were brought in some of the ships which we know visited the coast of Malabar and the Persian Gulf during the early centuries of the era. Attracted by the reports brought by the adventurous crews of these argosies of the might and wealth of China, Arab traders took heart of grace, and, following in the reverse track of the Chinese, found their way to Cathay, and settled themselves at Canton, and on the coasts of the Provinces of Fuhkien and Che-kiang.

It was not, however, until after the irruption of the Mongols into the west that European travellers ventured to cross Asia into China. At the head of these daring explorers went Christian missionaries, who feared neither the length of the journey nor the perils of the way so long as there was a chance of their being able to convert the barbarous subjects of the heathen khans to the peaceful doctrines of Christianity.

In the wake of these pioneers of civilisation followed lay travellers, who, from no other motive than love of gain and adventure, penetrated into every country of Asia, and in the leisurely manner common to wayfarers in those halcyon days before hurry was known, made themselves citizens of every country and denizens of every clime. The best-known

of these was Marco Polo, who made China his home for two decades, and who so won the confidence of the great Kublai Khan that for three years he held the office of Prefect of one of the busiest cities in the country. His immortal pages first gave to Europe an idea of the wealth and extent of the Chinese empire, of the richness of its marts, of the fertility of its soil, of the magnificence of its palaces and cities, and of the number and magnitude of the canals and roads which covered its surface.

It has been observed with justice that it has often been found that "profuse expenditure, heavy taxation, absurd commercial restriction, corrupt tribunals, disastrous wars, seditions, persecutions, conflagrations, inundations, have not been able to destroy capital so fast as the exertions of private citizens have been able to create it." Of the truth of this saying China is a signal example. In spite of an iniquitous system of administration, of corruption in high places, of the sale of justice, of dynastic changes, of revolutions, of floods, of famines, and of pestilences, the national prosperity of the empire has gradually increased and been built up, until at a period before our commerce had taken shape, Trade's proud empire held its sway throughout the land. The Chinese are essentially a nation of shopkeepers. They have a genius for trade, as is shown by the fact that almost wherever they have settled, whether in Burma, Siam, Tonquin, or the Straits Settlements, they have monopolised the higher branches of commerce, leaving to the native races the uncongenial tasks of hewing wood and drawing water. From their earliest history they have shown their capacity for amassing wealth. To a disciple who asked Confucius what should be done for the people, who had become so numerous, the sage replied, "Enrich them." Acting on this dictum, the nation's rulers have made the material well-being of the people one of their main objects, not, however, without an eye to the well-known principle, that there are no greater foes to violence and disorder than hostages given to fortune in the shape of goods and warehouses. And it must be confessed that the people have ably seconded the objects of their sovereigns. Every branch of commerce with which they are familiar has been eagerly developed, and it is not too much to say that, given the machinery which they possess, they have done as much as the wit and energy of man could possibly have accomplished to advance the trade and manufactures of the country.

Unhappily, however, the people have been grievously hampered in their operations by other political views of the ancient sages. Neither Confucius nor Mencius would allow for an instant that any foreigner had a right to consider himself as an equal with a native of the Middle Kingdom. "Indulgent treatment of men from a distance," with dutiful submission on their part to the commands of the Son of Heaven, were the conditions which Confucius recommended in dealing with foreigners; and Mencius gives us his estimate of the Gentile nations when he said, "I have heard of men using the doctrines of our great land to change barbarians, but I never yet heard of any being changed by barbarians. I have heard of birds leaving dark valleys to remove to lofty trees, but I have not heard of their descending from lofty trees to enter into dark

valleys." These are not the words of unadulterated wisdom, and it is strange, therefore, to find that a practically-minded people like the Chinese should be more influenced by the opinions of these remote philosophers than by the evidence of their own senses. Throughout the whole history of foreign relations with China the ignorant and supercilious dicta of so-called sages have tended to foster ridiculous assumptions on the part of the mandarins; and it has, unfortunately, to be confessed that, even at the present day, though the foreign Legations have been established at Peking for more than a quarter of a century, only a small breach has been made in the wall of conceit which separates China from the outer world.

In tracing the history of our own commerce with China we find that it was in the reign of Queen Elizabeth—that great period in our nation's history when the mental and bodily vigour of our countrymen awoke to new life and energy—that the first ships left our shores for Cathay. These vessels, which were equipped at the expense of Sir Robert Dudley, and were named *The Bear*, *The Bear's Whelp*, and *The Benjamin*, were destined never to reach their goal. As a matter of fact, they got no further than the neighbourhood of the West Indies, where they perished. Four years later a charter was granted to "the Governor and Company of Merchants of London trading to the East Indies"; and in 1606 James I. granted permission to Sir Edward Michelborne to trade in "Cathay, China, Japan, Corea, and Cambodia." Later again, Oliver Cromwell gave a charter to a "Company of Merchant Adventurers" to trade in Eastern Asia, and in 1698 another company came into existence, under the title of "The General Society trading to the East Indies," or "English Company."

But meanwhile private enterprise had been at work, and in 1635 a Captain Weddell, in command of some English ships, arrived at Macao bearing letters from the Viceroy of Goa to the Portuguese Governor of that port. Unfortunately for the success of his venture, the auspices under which he presented himself to the Chinese were the very worst he could have chosen. The Portuguese were already well known in China. During the preceding century they had established themselves at Ningpo and Macao, and although at first they were favourably received, their violence and unruly conduct soon belied the good opinion which had been formed of them. At Ningpo they so outraged the feelings of the natives by repeating on Chinese soil a squalid version of the rape of the Sabines that the Chinese rose against them, and "destroyed 12,000 Christians, including 800 Portuguese, and burned thirty-five ships and two junks." At Macao they held their own only by virtue of fortifications, which formed a protection to them from the assaults of the natives. The Chinese were not likely, therefore, to look with favour on any one coming under the ægis of the Portuguese name. But a still further blow was struck by his patron at the success of Captain Weddell's expedition. The Portuguese Governor so misrepresented the object of the Englishman to the Viceroy of Canton, that when the British vessels attempted to approach that city they were fired upon by the Bogue Forts. Being thus challenged, and greatly incensed, Captain Weddell returned the fire and captured the

forts—an operation which has since been repeated on several occasions by British sailors.

The result, however, of the expedition was not sufficiently encouraging to induce others to follow suit, and it was not until 1664, after the revolution which displaced the Ming dynasty in favour of the present Manchu line of sovereigns, that any further attempt was made to open communication with China. Amoy was the port chosen at which to establish trade, and it was thence that the first supply of tea was brought to England, as is evidenced by the name under which we know the leaf. In the northern, central, and western provinces of China the word for tea is pronounced *Ch'a*, but in the Amoy dialect it is sounded *Té*, the name by which our grandmothers always knew it. In the poetry of the last century we have abundant evidence of the currency of this pronunciation—witness the well-known lines of Pope on Hampton Court Palace:

> "Here thou, Great Anna! whom three realms obey,
> Dost sometimes counsel take—and sometimes tea."

But the restrictions placed upon British trade along the coast by the mandarins was such that it did not flourish, and eventually it became concentrated at Canton. There, however, the Chinese, true to their colours, threw every obstacle they could in the way of the merchants. They appointed one man who alone had the right of trading with them, and, in addition to the original duty of 4 per cent. on all goods, whether exports or imports, they laid a further burden of 12 per cent. on imports and 10 per cent. on exports.

It was plainly impossible that a profitable trade could be carried on under such disabilities, and in answer to repeated remonstrances the extra 10 per cent. on exports was taken off; but, with characteristic conceit, the Emperor coupled the relaxation with the condition that the foreign merchants should hear upon their knees the act of grace read. This humiliating performance was happily averted by the united front shown by the community to the insulting proposition. But the attempt to impose it was characteristic of the manner in which the mandarins then treated the foreign merchants, and is characteristic of the spirit which even now inspires much of their foreign policy. Though as time went on matters improved slightly, the grievances under which the merchants suffered up to the time of the treaty of 1842 were burdensome in the extreme. They were virtually prisoners in the factory; they were allowed to communicate only with the Hong merchants, who were appointed by the Governor of the city, and who were held responsible for all debts incurred and all irregularities committed by the foreign merchants. They had imposed upon them eight regulations, framed by the mandarins for their conduct, one of which strictly prohibited the introduction into the factory of European women, guns, spears, or any arms, and another of which forbade them rowing on the river, or taking any exercise for pleasure outside the factory grounds. Neither were these rules allowed to be treated as dead letters. On the slightest infraction of them the trade was stopped, and sufficient pressure was brought to bear to compel compliance with them.

Twice during this period the British Government sent embassies to China. In 1792 Lord Macartney visited Peking, and had several interviews with the Emperor K'ienlung, who received him with courtesy, and showed every consideration both to himself and his suite. From the interesting account of the embassy, subsequently published by Sir George Stanton, one of the staff, we learn how much the members of the embassy were struck by the magnificence of the Emperor's palaces, the beauty of his grounds, the wealth of the cities, and the fertility of the country. But from a political point of view the mission proved abortive. The several points which the ambassador was instructed to urge on the Chinese Government, viz., the authority to open Chusan, Ningpo, and Tientsin to foreign trade, the abolition of transit dues between Macao and Canton, and the removal of all illegal taxation on foreign goods, were left *in statu quo ante*. The civility, however, which had been shown by the Emperor to the mission roused the smouldering hatred of the anti-foreign party, who did everything in their power to drive the foreigners, and especially the English, out of Canton. Lord Amherst's mission, in 1816, had not even the same appearance of success which attended Lord Macartney's. On arriving at Peking, after an unusually tiring and hurried journey, the Minister was required to present himself at once before the Emperor. Such a breach of diplomatic as well as of social usage was resented by Lord Amherst, who refused to appear in the Imperial presence with the stains of travel and fatigue upon him. The kind of man the Emperor was may be gauged by the opening sentence of a letter which he addressed to George III. of pious memory :—"Your Majesty's kingdom," he wrote, "is at a remote distance beyond the seas, but is observant of its duties, and obedient to its laws, beholding from afar the glory of our empire, and respectfully admiring the perfection of our government." A man who could pen such lines to our sovereign was not likely to put up with a refusal from that sovereign's ambassador, and he at once gave orders that Lord Amherst should be sent about his business.

The conduct of the Chinese had been so bad that this diplomatic miscarriage could scarcely add to its condemnation, and matters went on at Canton pretty much as formerly. The merchants were kept in a state of tutelage, and were not allowed to visit Macao or to return to Canton without special leave, entailing a cost of about £80 a trip; their commercial dealings were narrowly circumscribed, and every possible insult was offered to them. Thus things stood in 1834, when it was determined to cancel the charter of the East India Company, and to appoint a Minister Plenipotentiary to watch over the interest of the British community. The evil fortune which had attended our previous attempts to open new relations with the Chinese Court was present on this occasion also. Both the mission of Lord Macartney and that of Lord Amherst had synchronised with the wars in Nepal, in both of which we were represented as the foe of China; and at the time of the appointment of Lord Napier as Minister Plenipotentiary the natives were agitated by an apprehension that the silver exported from the country to pay for the opium imported was rapidly draining the empire of its wealth. A report

had been made in 1833 to the throne stating that sixty million taels of silver—the equivalent of £20,000,000 sterling—had been sent out of the realm in payment for a drug which was still further impoverishing the country by destroying the energy and moral fibre of the people.

Further, the arrival of Lord Napier, though expected by the mandarins, was not of the nature they had anticipated. They had thought that he would have been a mere headman over the merchants, who would be willing to eat the very humble pie which had been the habitual fare of the inhabitants of the factory. But to their surprise and annoyance he came up to Canton without asking for the required permission to do so, and actually wrote direct to the Viceroy asking for an interview, instead of communicating with him through the syndicate of native merchants. The Viceroy was in no humour to endure such presumption. He therefore refused to receive any communication from the Minister except in the shape of a petition, and explained his position by saying, "that the great Ministers of the Celestial Empire, unless with regard to affairs of going to Court and carrying tribute, or in obedience to Imperial commands, are not permitted to have interviews with outside barbarians." Lord Napier, finding peaceable overtures unavailing, and not having sufficient troops at his back to enforce his demands, withdrew to Macao, where he died from an illness produced by the worry and annoyance to which he had been subjected.

Captain Elliot, who succeeded Lord Napier, met with an intensified opposition from the mandarins, which was still further aggravated by the arrival at Canton of Governor Lin, who was charged by the Emperor with the duty of "cutting off the fountain of evil," *i.e.* opium. Already Captain Elliot had been obliged by force of circumstances to issue a notice warning British subjects to discontinue the illicit opium trade; and when, therefore, Lin on his arrival demanded the surrender of all opium held by foreigners within three days, the merchants were compelled to submit. But even this surrender did not satisfy Lin, whose ultimate object was not so much to put a stop to the opium trade as to drive the Europeans off the coast. He shortly afterwards demanded from Captain Elliot that all the opium which had accumulated since the previous surrender should be handed over to him. To this also Captain Elliot agreed, and in the result more than 20,000 chests of the drug, of the estimated value of over £2,000,000 sterling, were given up. Experience has proved that to yield to the demands of the Chinese in the hope of conciliating them is as futile as it is weak. So Captain Elliot found, as others have found since. The concession he had made, which should have more than satisfied Lin, only encouraged him to make further and more exacting demands, until at last even Captain Elliot's patience was exhausted, and he placed the direction of affairs in the hands of Admiral Sir John Bremer. After some unimportant engagements in the Canton river the fleet sailed northwards, occupied Chusan, and advanced to the mouth of the Peiho, the river leading to Peking. Such a proximity of the uncontrollably fierce barbarians disturbed the Court of Peking not a little, and Kishên, the Governor of Chili, was sent post-haste to stop the advance of the English ambassador. Unfortunately, Captain Elliot

yielded to Kishên's wishes, as he had before yielded to Lin's demands; and after having been kept loitering at the mouth of the Peiho for some time, was induced to transfer the scene of the negotiations to Canton. This was but a move in the accustomed Fabian policy of the Chinese, and was provocative only of further contention between the two Powers. At last affairs reached such a pitch that the Queen declared war, and despatched Sir Henry Pottinger as plenipotentiary, with a force under Sir Hugh Gough and Admiral Parker to support him. The Chinese now learned too late the folly of their action. In quick succession Amoy, Chusan, Ningpo, Shanghai, and Chinkiang were taken, and the guns of Admiral Parker's ships were about to open on Nanking when Chinese Commissioners appeared with authority to make terms.

In studying the action of the Chinese it is curious to observe with what alacrity they act under the influence of fear, and how immovable they are when there is nothing more to dread than the interchange of despatches and interviews quite irrespectively of the right or the wrong of the question in dispute. With unwonted celerity the Commissioners conducted their negotiations with Sir Henry Pottinger and their references to Peking, and on the 29th of August 1842 a treaty was signed by which Hongkong was ceded to Britain, the five ports of Canton, Amoy, Foochow, Ningpo, and Shanghai were opened to trade, and 21,000,000 dols. were agreed to be paid in compensation: namely, for the opium destroyed 6,000,000 dols., in consideration of the debts of the defaulting Hong merchants 3,000,000 dols., and for the expenses of the war 12,000,000 dollars.

These concessions were wrung from the Chinese *vi et armis*, and were grudgingly acted upon. Every obstruction and annoyance which could be invented was still placed in the way of foreign trade, and the foreigners themselves were treated with studied contempt. A fair indication of the manner in which the officials still regarded them and their claims to equality was given by the fact that no foreigner was allowed to enter the city of Canton, and it was not until the Treaty of 1858 that the gates were thrown open.

The history of the next fifteen years presents but a succession of hostile acts, covert and overt, on the part of the Chinese, and patient endurance, varied occasionally by reprisals, on our side. But the time came when it was felt that our relations with the Chinese could never be satisfactory unless we had constant and direct communication with the central Government by means of a Minister at Peking. Sir John Bowring was instructed, therefore, to put an end to the acts of injustice and deceit which were being constantly practised by the mandarins, by declaring war on the first distinct breach of international rights. The opportunity was not long in presenting itself. In defiance of the British protection the Chinese boarded a lorcha carrying the Union-Jack, hauled down the ensign, and carried off some of the crew. War followed, and a joint British and French expedition was sent out, with Lord Elgin and Baron Gros as Envoy-Plenipotentiaries. As a preliminary act, Canton, which had been the chief scene of "wrongs unredressed and insults unavenged," was taken; and subsequently, the barrier at the mouth of

the Peiho having been forced, the Envoys proceeded to Tientsin, where they were met by commissioners, who announced their willingness to treat. Without much difficulty a treaty was agreed upon by which, among other things, the right of establishing Legations at Peking was conceded; the nine new ports of Tientsin, Newchwang, Chefoo, Swatow, Chinkiang, Kinkiang, Hankow, Tamsui in Formosa, and Kiungchow in Hainan, were opened to trade; the payment by the Chinese of an indemnity of 4,000,000 taels of silver was agreed to; and the undertaking was entered into that neither import nor export duties should exceed 5 per cent. *ad valorem* except in the case of opium, which was to be taxed to the extent of about £10 per chest, a tax which, at the price then ruling, amounted to 8 per cent.

It was confidently hoped that this treaty would have put an end to the state of uncertainty and hostility on the part of the Chinese which had disturbed the foreign relations of the country for many years. For a second time the Chinese had been defeated in the field, and had now been obliged to sign a treaty in the neighbourhood of the capital, at a city never before visited by a hostile European force. It might well have been anticipated that the capture of Canton, one of the strongest cities of the empire, and the easy brushing away by our soldiers and sailors of the obstacles to the approaches of the river leading to Peking, would have taught the Chinese the futility of all attempts to oppose their raw levies and undrilled battalions to the troops of England and France. But the Chinese are clothed with so tough a triple coat of conceit that it was, and still is, except in the case of some few enlightened officials, impossible to induce them to recognise even the equality of Europeans with themselves. It was, as it is still, their opinion that they are the salt of the earth, and their power is supreme. It is true that in 1858, as in 1842, they were compelled to drop their "shattered spear," but that was due, so they professed to believe, to the faults and follies of the commanders who directed their armies. The power was theirs—it was only that on those occasions it was misused. Such were the feelings with which the commissioners solemnly signed the treaty at Tientsin, with the mental reservation that, so soon as they were able, they would tear it across and drive the barbarians into the sea.

It was arranged that the ratified treaties should be exchanged at Peking in the following year, and Lord Elgin having returned to England, it was agreed that his brother, Frederick Bruce, should make the exchange. During the interval ugly rumours had been circulated to the effect that the fortifications at the mouth of the river had been restored and refurnished with guns. But Englishmen are not prone to indulge in the "treason of mistrust," and Mr. Bruce proceeded to the Peiho without any suspicion that serious opposition would be offered to his advance up the river. But he was soon undeceived. For once rumour proved to be in accordance with facts. The forts on both banks bristled with cannon, and the passage was barred by stakes and booms. In these circumstances Mr. Bruce requested Admiral Hope to force an entrance, which that officer, who was never backward when a blow had to be struck, at once attempted to do. But the obstacles proved to be too formidable for the

force which he had at hand. When the first gunboat touched the booms the guns in the forts opened fire with terrible effect, and the day ended in the discomfiture of Admiral Hope's sailors and marines, and with the loss of eighty-nine men and of three gunboats.

Treason never prospers, and this act of base treachery on the part of the Chinese was destined to bring upon them a yet more crushing defeat than any they had as yet suffered. The news of the reverse at Taku no sooner reached London than steps were at once taken to despatch an expedition, in which the French joined, to avenge the insult offered to our envoy, and to inflict punishment for the breach of faith committed. Lord Elgin again represented the Queen, and a considerable force, under Sir Hope Grant, with a French contingent under General Montauban, assembled in 1860 with the intention of marching to Peking. This was done. The Taku Forts, which had been the scene of the surprise of the year before, were taken, Tientsin was occupied, and eventually a gate of the city of Peking was surrendered to our troops. From this coign of vantage Lord Elgin opened negotiations with Prince Kung, the brother of the Emperor Hienfêng, who had fled to Mongolia on the approach of our soldiers, and signed with him the treaty which now, modified only by the Chefoo Convention, by which Ich'ang, Wuhu, Wênchow, and Pakhoi were added to the Treaty Ports, governs our relations with the Chinese.

I have entered thus fully into this, the first part of my subject, in order to present a consistent picture of the attitude assumed by the Chinese towards ourselves. They were not averse to allow our countrymen to trade at Canton as long as they were content to be cabin'd, cribb'd, confined within the factories, and to be treated with ignominy and contempt, just as they allowed solitary travellers like Marco Polo and others to journey through the empire without let or hindrance. But directly the foreigner asked to be treated as citizens of an equally great commonwealth as that of the Middle Kingdom, and made justice their plea, the Chinese refused to listen to their demands, and, professing to regard them as vipers which they had unwittingly nourished in their bosoms, attempted to destroy them utterly. This unfortunate course of action was the natural outcome of the combined pride, ignorance, and fear which has always guided the policy of China. Every order which was issued and every edict which was published regarding the intruders was couched in terms which could be justified only by the possession of a vast superiority. The Emperor and his advisers knew so little about us that they were ignorant of whence we came, and believed us to be on a par as regards power with the petty Mongol chiefs and Lolo savages whom they had been accustomed to quell with a blow. (Even during the war of 1860 a memorial was found addressed by Prince Sankolinsin to the Throne, in which the writer asserted that, as our men were powerless to fight except on board ship, he had enticed them on shore in order to overwhelm them.) Then again, their fears were aroused by the reports which reached them, of how we, having originally settled as merchant adventurers at the mouth of the Hugli, and at Fort St. George, had ended by deposing the native princes, and forming a mighty empire.

This knowledge, coming as it did at a time when we were making constant advances in China, may well have disturbed the minds of those among the rulers of the empire who may have been secretly aware of the comparative weakness of their defences, and we need not, therefore, be extreme to mark the errors and follies which arose from this not unnatural alarm. But less excuse can be found for the persistent neglect on the part of the mandarins of their international obligations, or for the trickery by which they have ever attempted to neutralise the privileges to which our treaties have entitled us.

Coming now to the second part of my discourse, we find that when the present condition of things was brought into existence, the belief was current that the establishment of our Minister in Peking, with power to communicate directly with the central Government, would put our relations with China on an entirely new footing, and that a happy period had arrived when every mercantile dispute would be settled out of hand, and when travellers and missionaries would be as welcome to move freely about in the empire as they would be in France or Russia. Unfortunately, this dream has not been realised. The convictions and views of the Chinese as regards Europeans have been marvellously little affected by the presence of the half-dozen Legations which have now been established at Peking for nearly thirty years. No doubt the once familiar gunboat has appeared less frequently than formerly; but it is a question whether the mercantile claims have been much more speedily settled than before the last war. Certain it is that a never-ending contention has been carried on between our Legation and the Tsungli Yamên concerning commercial rights withheld or interfered with, unsatisfactory judicial proceedings, and an absence of all administrative progress. Writing in 1876, fifteen years after the establishment of the British Legation at Peking, Sir Thomas Wade said: "The anti-foreign feeling in the country is, on the part of a large majority of the educated class, as violent as ever it was. The leading members of the central Government, so far as there is one, are in a great degree anti-foreign." This being so, the privileges gained by the treaty have been robbed of much of their value. Nevertheless, the opening of the new ports has unquestionably given fresh facilities for trade, and has added points of contact not only on the sea-coast, but on the Yang-tsze-kiang, supplying both new markets for our goods, and means of becoming better acquainted with the people.

But with this new order of things there have sprung up entirely changed conditions, under which our merchants are called upon to pursue their callings. Until the treaty of 1858 the foreign trade in China was almost entirely in the hands of British merchants. They had no serious competition to fear, and they conducted their business in the leisurely and very profitable manner begotten by this circumstance. But with increased energy on the part of American and Continental firms, the practical monopoly enjoyed by the British has been abolished, and not only abolished, but the scales have been so turned that, while of late the trade with the United States of America and the Continent has been increasing, the trade with this country has been falling off. This the following figures show:—

In 1866 the value of the trade of this country with China was *Taels* 49,770,547; that of America was *Taels* 6,605,962; and that of the Continent of Europe, exclusive of Russia, was *Taels* 1,634,280.

In 1875 these totals were respectively, *Taels* 50,297,151; *Taels* 8,690,166; and *Taels* 9,345,630.

In 1885 they were *Taels* 45,983,873; *Taels* 11,613,124; and *Taels* 9,822,717.

In 1889 they were *Taels* 36,824,264; *Taels* 10,889,785; and *Taels* 19,739,695.

These figures, which I have taken from the Trade Reports of the Imperial Maritime Customs, display an ominous state of things. They show that since 1866 our direct trade has declined rather more than one-fourth, while the American trade has increased forty per cent.; and the value of the Continental trade has multiplied twelve times over. In other words, while in 1866 the value of the Continental trade was only one-thirtieth that of ours, last year it was more than one-half.

This decline of our trade was, I find, accompanied by an increased British population at the Treaty Ports. I have only been able to compare the statistics on this point of the years 1879 and 1889, and from them it appears that in the first of these years the number of British residents was 2070, and that in 1889 their number had increased to 3276. Thus, while the number of British residents has increased, British trade has decreased.

What, then, is the cause of this decline? Undoubtedly it is the competition which has grown up of late, especially on the part of the Continental States. With new energy, and with the experience gained by observation, the traders of these Powers have invaded the fields where we were accustomed to reign almost alone, and certainly supreme. They jostle us in the markets, compete with us, and, it must be confessed, often successfully, in obtaining contracts; and push their trade by means unknown before their advent in the East. At the back of this private enterprise stand the various Governments, which, with enlightened generosity, have established museums of Eastern products, and schools for instruction in the languages of the Orient. In Germany the Imperial Government gives a grant of £3600 a year to the School of Oriental Languages which has of late been opened at Berlin, and where 120 students, according to recent information, study the principal languages of Asia. In Paris a still larger annual grant—£6000—is given in support of a similar school; and in St. Petersburg and Vienna subsidies are in the same way given to like institutions. England, whose interests in the East are immeasurably greater than those of any other European country, is alone in refusing Government aid to the study of Oriental languages. It is needless to emphasise the fact that to merchants in China a knowledge of the language is of incalculable advantage. It enables them to travel through the country with ease and profit, to acquaint themselves personally with the condition of the inland markets, to gain the confidence and understand the wishes of the people, and to establish friendly and personal relations with the mandarins.

A few years since one well-known English firm, recognising the

commercial value of these advantages, enlisted the services of a member of one of Her Majesty's Consulates, and was benefiting largely by the assistance of this gentleman, when unhappily his usefulness was cut short by death. The results of the experiment, however, were so eminently satisfactory, that arrangements have been made, or are in course of being made, by the same firm, for securing instruction in Chinese for a number of young clerks at Peking. It cannot be doubted that the example thus set will be followed by others, and that before long men going to China will equip themselves with a knowledge of the language as regularly as they now provide themselves with their material outfits. In anticipation of this condition of things the Imperial Institute, in conjunction with King's College and University College, has established in London a School of living Oriental Languages, where all the principal tongues of the East are taught, and where young men preparing for a life in Asia may acquaint themselves with the history, geography, and products, as well as the languages and literatures of the countries to which they are going.

These considerations bring me to the third division of my lecture—the future of our commercial relations with China. A glance at the map of the empire will show that while the treaty ports now existing place us in touch with the principal markets in the eastern, central, and southern provinces, there lies beyond the mountain barriers which form the western boundary of the great plain of Northern China, vast provinces which, by their geographical position, are practically cut off from the rest of the country. Of these provinces incomparably the richest are Szech'uen and Yunnan. Combined, these provinces occupy an area as large as that of France and half of Germany added to it; they are inhabited by a population of 40,000,000 or 50,000,000 souls, and they possess a soil which is singularly rich in minerals and in surface crops. All the copper used in the Imperial Mint is brought from Yunnan, as well as large supplies of silver, while the soil yields in abundance corn, tobacco, and opium. The level portions of Szech'uen are blessed with an even more fertile soil than Yunnan, and produce in superabundant quantities all that is necessary for the comfort and well-being of man, with the exception of cotton. The wealth of the inhabitants is attested by the substantial nature of their houses and the general comparative comfort in which they live. It is in these provinces, therefore, that we must chiefly look for the development of our trade in China in the near future. But the difficulty is to get at them. At the present time our frontier in Burma is conterminous with that of Yunnan, and for centuries a certain amount of trade has been carried on between the two countries by the footpaths which traverse the mountain ranges, separating Yunnan from Bhamo in Burma. This, therefore, would appear at first sight to be the natural route for us to adopt. As the crow flies the distance which divides the two termini is 375 miles, but "the avenues of precipices" which line the passes between them make it necessary to take so circuitous a route that the distance is lengthened to the traveller by the addition of 115 miles. This, however, is but a trifling difficulty compared with the impossibility of making the route available for aught else but

mules and coolies. Several of the passes rise to an altitude of over 8000 feet, and so narrow are the paths between the perpendicular cliffs and precipitous ravines, that in places it is with the greatest difficulty that two mules can pass one another. Over such a country a railway would only be made, as Mr. Baber wrote, "by piercing half a dozen Mont Cenis tunnels, and erecting a few Menai bridges." Such an undertaking being plainly outside the range of practical engineering, the question of the feasibility of this route may be said to be settled.

The ranges, however, which prevent such an insuperable difficulty between Bhamo and Yunnan lower their crests as they approach the sea in the neighbourhood of Maulmein, in Lower Burma. A careful survey of the passes in this part, made by Mr. Hallett, has revealed the existence of a perfectly practicable route connecting Maulmein with Raheng, in Siam. From this point northward through Siam and the Shan States to the frontier of Yunnan no serious physical difficulty presents itself whatever; and if the Indian Government could be induced to combine with the Siamese authorities, a railway might be made on these lines which would connect Burma with China, which would open out the markets of Yunnan and Szech'uen, and would shorten the voyage between England and Western China not by days but by weeks.

But Britain is not the only European Power which now borders on the frontiers of Yunnan. On the south-east the French province of Tonquin is separated only by a line of demarcation from it; and, more fortunate than ourselves, the French are in possession of a river—the Red River—which traverses their territory from the sea to the desired El Dorado. Rapids and pirates have until lately made travelling upon this stream a matter of danger and difficulty; but both these obstacles have yielded to the energy of the French colonists, and at the present time a line of merchant steamers is running between Haiphong, on the Gulf of Tonquin, and the neighbourhood of the town of Mengtzu, in Yunnan, where a foreign trade is already springing into life. It is plain, therefore, that if we wish to prevent the foreign trade of the province from gravitating entirely towards Tonquin, we must vote the question of establishing a route on the Burmese side a matter of urgency. It is notoriously difficult to induce British officials to inaugurate a new system; but when, as in the present case, so much is at stake, it behoves all those who are interested in the extension of our Eastern commerce to agitate until they gain their desire.

Szech'uen is, from a commercial point of view, in an even more unfortunate position than Yunnan. On its northern, eastern, and western frontiers it is bordered by ranges of lofty mountains, which rise one behind another like rows of sharks' teeth. Indeed, the province may not inaptly be likened to the upper portion of a shark's jaw, the palate representing the level country in the neighbourhood of Ch'êngtû, the provincial capital. Crossing the southern portion of the province runs from west to east the great river, the Yang-tsze-kiang, which in the course of countless ages has cut by its fretful action a succession of deep and gloomy gorges through the limestone mountain barriers on the east, and formed with the *débris* of its own destructive work innumerable rapids

and eddies, which disturb its course for nearly 400 miles. This troubled stream forms practically the only line of communication between Szech'uen and the eastern provinces of the empire. On its tossing waters the products of Szech'uen are floated down to the ports on the lower Yang-tsze-kiang, and over its rapids and foaming eddies every bale of cotton goods and every case of cutlery destined for the markets of the west have to be laboriously towed up. In winter a trading junk takes on an average six weeks to make the upward voyage of 400 miles from Ich'ang, the last port below the rapids, to Ch'ungk'ing, the first town above them, though a small passenger boat can, if fortune befriends it, make the journey in half that time. In the summer, with changed conditions, the danger of navigation is increased, for the river, fed by the melted snow on the mountains westward, rises fifty or sixty feet above its lowest level. At such seasons all trace of the rapids is obliterated, and the river becomes a "continuous whirling torrent, running about six knots an hour."

At the present time, though the wealthy inhabitants of Western China represent 30 per cent. of the population of the whole empire, they only absorb 9 per cent. of the foreign imports. It is therefore obvious that, by improving the means of communication with Szech'uen, we may fairly expect that the volume of foreign trade would be enormously increased. This was in the mind of Sir Thomas Wade when he stipulated in the Chefoo Convention that so soon as steamers should have succeeded in ascending the river as far as Ch'ungk'ing, that port should be opened to foreign commerce. Acting on the permission given in this treaty, Mr. Little, a Shanghai merchant, had a steamer specially constructed to face the difficulties of the rapids, and proceeded to Ich'ang to make his final arrangements for the ascent. Unhappily, one of his final arrangements took the shape of a communication to her Majesty's Minister at Peking, requesting him to obtain a permit from the Chinese Government for the experimental voyage. Now, one guiding principle which should govern all dealings with Asiatics is this: having a right which you wish to exercise, act upon it without hesitation. To raise the question as though there were a possibility of a doubt as to your right is at once to create a doubt; and one might as well try to

> "hold a fire in one's hand
> By thinking on the frosty Caucasus"

as seek to gain the consent of a Chinaman to a new undertaking when you open to him a door for refusal or obstruction. With true Oriental instinct the Chinese Government at once raised objections to Mr. Little's scheme. They suddenly developed an overwhelming anxiety for the safety of the river junks, which might be imperilled by the presence of the steamer; they expressed fears that the monkeys which haunt the gorges might endanger the lives of the steamer's crew by throwing down stones on the deck; and they announced themselves as apprehensive that if his steamer were suddenly to make its appearance in the gorges, the boatmen and trackers, who at the best of times earn only precarious livelihoods, might be moved, by the fear of losing their occupation, to create riot and disorder. To avoid each and all of these complications, they proposed to appoint two officials to consult with the British Consul at

Ich'ang on the regulations which it would be necessary to frame for the government of the traffic through the gorges. The appointment of commissioners is one of the favourite obstructive methods of the Chinese. We have had some experience of the delays arising from it in Sikkim lately. We desired, for certain good and sufficient reasons, to advance our protectorate over that State. This was objected to by the Emperor of China, who, as suzerain of Tibet, considered most unnecessarily that his manorial rights were threatened; but, to settle the matter, he appointed a commissioner to come to terms with our authorities on the spot. The commissioner appointed was a mandarin, holding office in the remote province of Kuldja. With extreme deliberation this official travelled across Central Asia, and was so exhausted by the journey that, on arriving at Tibet, he required some months' rest to recover from the effects of the road. At last he appeared at Simla, where another prolonged stay was necessary for his health. Finally, he arrived at Calcutta, where, not having a diplomatic leg to stand upon, he signed a convention, formally agreeing to our doing that which we had originally proposed to do. Meanwhile five years had elapsed; envoys had constantly passed backwards and forwards between Peking and Calcutta with no other object than the waste of time; and we had done nothing, lest any move on our part should be regarded as an unfriendly act towards an allied power.

After the manner pursued in this case, the officials appointed to proceed to Ich'ang were residing in distant provinces when their call came. Like their Kuldja colleague also they showed no disposition to bestir themselves to fulfil the directions of their sovereign, but, with halting steps and slow, made their way by extremely leisurely stages to Ich'ang. By this and other devices, two years were wasted, and as even then there appeared to be no prospect of a satisfactory solution of the question at issue, Mr. Little was glad to play into the hands of the commissioners by agreeing to sell his steamer to the Chinese Government. Exactly the same course was pursued by the Chinese in the case of the Woosung-Shanghai railway in 1876. A tacit consent had been given by the Viceroy of the Two Kiang to the construction of the line, but no sooner was it opened than objections were raised to its existence; the inevitable commissioners appeared, and after months had been spent in diplomatic wrangles, the line was purchased by the Government on the understanding that it should be worked under Chinese management. Instead of this, however, it was allowed for a time to go to wrack and ruin, and finally the metals were only saved from utter destruction by being torn up and shipped to the island of Formosa, where, it is said, they were turned to some kind of use. This precedent should have been a warning to our Minister at Peking in dealing with the Ch'ungk'ing matter. But, unmindful of it, he not only sanctioned the transfer of the steamer to Chinese hands, but concluded a convention by which it was agreed that no English steamer should attempt to go up to Ch'ungk'ing until a Chinese steamer had made the voyage up and down carrying cargo—in other words, *ad calendas Græcas*.

I have laid emphasis on these instances of Chinese manœuvres

because "in to-day already walks to-morrow"; and, unless in the future we adopt a firmer and wiser policy in China, we must expect, whenever discussions arise, to see a repetition of the same dilatory tactics by which the mandarins exhausted Mr. Little's patience and frustrated the railway scheme. A splendid future is open to us if those with whom the initiative rests will consistently pursue a firm and equitable policy in their dealings with the Peking Government. Such a policy is the only one to which the Chinese will yield, and it will alone place our relations with the empire on a solid and satisfactory basis. But the responsibility does not rest entirely on the side of the Government, as we are too apt to consider. The mercantile communities have their work to do. They also should have a settled policy. They should make up their minds as to what may be fairly asked for in the interests of British commerce, and having done so, they should leave no stone unturned to gain their end, and at the same time they should do all that in them lies to make the most of the opportunities within their reach.

But the first and obvious duty of officials and non-officials alike is to keep the even tenor of a just and consistent course in regard to our future relations, and then our ship of Commerce, which has until now been sorely tossed about the rocks of wrong and duplicity, will sail into the smooth waters of the sure haven of peace and goodwill.

EXAMINATION SCHEME OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

THE Examination was held on Saturday morning, 29th November, at Edinburgh, St. Andrews, Aberdeen, and Anstruther.

Copies of the Examination Paper were sent from Edinburgh, and the examination at each centre was superintended by members of the Society.

The following Syllabus was issued by the Society's Education Committee some months before the Examination :—

THE INTERPRETATION OF MAPS, AND THE GEOGRAPHY OF THE BRITISH ISLANDS.

JUNIOR PAPER—

1. *The Meaning and Use of Maps, including an acquaintance with the* 1-*inch Contoured Maps of the Ordnance Survey, preferably that of the School Neighbourhood.*
2. *The World-position and Configuration of the British Islands.*
3. *The Coast-line, and the chief River-systems.*
4. *Mining, Manufacturing, and Agricultural Regions in relation to their Physical Geography.*
5. *Principal Seaports and Commercial Towns.*

SENIOR PAPER—

In addition to more detailed knowledge of the above, there will be required in Section 1, some knowledge of the 6-inch Map ; in Section 2, the Climatic relations

of the British Islands; in Section 5, the Railway Lines connecting the Chief Towns with each other; and also—

6. *The Outlines of the Historical Geography of the British Islands.*
7. *The Railway-system of Scotland, including the different Companies; and the Geographical Causes of the Importance of the Main Lines.*

The Examination Papers, prepared by Dr. Hugh Robert Mill and Mr. William Jolly, H.M.I.S., were as follows :—

SENIOR PAPER.

The time allowed for this Paper is two and a half hours.

1. Describe as fully as possible the region represented in the accompanying map: (1) as it is, the scale being 1 inch to a mile, and the contour lines corresponding to the heights marked upon them; and (2) as it would be if the scale were 6 inches to a mile, and the contour lines one-tenth of the numbers marked—*i.e.* the line marked 1000 feet being taken as 100, the line of 1500 as 150, etc. Both scales are given on the map.

2. Contrast, with reasons, the counties of Kent and Caithness, as regards position, surface, climate, productions, and railways.

3. Give one example, under each head, of a district, or a town, in the United Kingdom, which owes its prosperity mainly to (*a*) Fishing, (*b*) Sheep-farming, (*c*) Grain-growing, (*d*) Mining, (*e*) Manufacturing, (*f*) Trade; and state shortly the causes in each case.

4. Mention the districts in the British Islands in which the people are respectively of Celtic and of Teutonic descent; and specify the causes that have led to this localisation.

5. Draw a sketch-map showing the *chief* lines of the North British Railway, with the chief towns and the junctions. Explain why the Highland Line from Perth to Wick is so indirect; stating, as nearly as you can, the direct distance and the railway distance between these towns.

JUNIOR PAPER.

The time allowed for this Paper is two and a half hours.

1. Draw in the water-shed on the accompanying contoured map. Suppose it were necessary to build a perfectly level railway from A to B, both stations being 1250 above sea-level, draw the route on the map, describe its changes of direction, and measure its total length. Suppose the shortest possible railway were constructed between A and B, describe its changes of level, and show where bridges would be necessary, and where tunnels would be desirable. The scale of 1 inch to a mile shown on the map may be cut off and used for measuring distances.

2. What parts of the coast of Europe lie exactly east of the following towns, Wick, Aberdeen, Dundee, Berwick, Hull, and Yarmouth; and what lies south of Portland Bill?

3. Describe the rivers Spey and Trent. Show how they are unlike each other, by reference to—(1) the nature of the country through which each flows; (2), the towns upon it; and (3), the uses of each river.

4. State precisely the causes that have made Mid-Lothian, Linlithgow, and Lanark thickly peopled, full of large towns, and crowded with railways; while Argyllshire and Inverness-shire have few inhabitants, no large towns, and few railways.

5. Draw a sketch-map of Ireland, marking the provinces and the four largest

towns. State for what these towns are respectively remarkable, and the causes which make them important.

6. Mention either (*a*) the chief cotton, *or* (*b*) the chief woollen manufacturing, district in England; give the names and positions of the chief towns in the district mentioned, and any reasons for the manufacture being carried on where it is.

RESULTS.

Examination Papers Received.

	Junior.	Senior.	Total.
Madras College, St. Andrews,	1	13	14
Gordon's College, Aberdeen,	23	29	52
Waid Academy, Anstruther,	8	19	27
Heriot's Hospital School, Edinburgh,	...	44	44
Totals,	32	105	137

Junior Papers,—		
First-class honours,	3	
Second-class ,,	19	
Failed to satisfy,	10	
	—	32
Senior Papers,—		
First-class honours,	7	
Second-class ,,	59	
Failed to satisfy,	39	
	—	105
Total,		137

	Junior.			Senior.			Total.
	1st Cl.	2d Cl.	Failed.	1st Cl.	2d Cl.	Failed.	
Madras College, St. Andrews,	...	1	...	..	8	5	14
Gordon's College, Aberdeen,	2	16	5	2	18	9	52
Waid Academy, Anstruther,	1	2	5	...	9	10	27
Heriot's Hospital School, Edinburgh,	...	...	...	5	24	15	44

List of Senior Examinations.

First Class.

		Per cent.
1	David M. Clark, Heriot's Hospital School,	80
2	Alex. R. Scott, do.	78
3	George Ednie, do.	77
4	Alex. Cowie, Gordon's Col., Aberdeen,	76
5	Fred. Gardiner, Heriot's Hospital School,	75
	Jas. W. Purves, do.	75
	James M. Cowie, Gordon's Col. Aberdeen,	75

Second Class.

		Per cent.
8	Andrew D. M'Ard, Heriot's Hospital School,	72
9	Agnes W. Murray, Madras Col., St. Andrews,	71
10	Robert H. Masson, Gordon's Col., Aberdeen,	70
11	George Jas. Pockney, Her. Hosp. School,	68
12	Benjamin Diack, Gordon's Col., Aberdeen,	66

		Per cent.
13	Jas. Wilson Clyne, Gordon's College, Aberdeen,	65
	Thomas Cavanagh, Her. Hosp. School,	65
15	Jas. Stenhouse, do.	63
	John W. Henderson, do.	63
	John Robertson, Gordon's Col. Aberdeen,	63
	David Dewar, do.	63
19	George Aitchison, Her. Hosp. School,	62
20	Andrew Hunter, do.	61
	Wm. Dickison, do.	61
	James Middleton, do.	61
	Robert Wood, Gordon's Coll., Aberdeen,	61
	Wm. Hannan, do.	61
	Annie Porter, Waid Academy, Anstruther,	61
26	Christina Porter, do.	60
	Fanny B. Smith, do.	60
	Andrew Wallace, Her. Hosp. School,	60
	James Lumsden, do.	60
	James Gilbert, Gordon's Coll., Aberdeen,	60
	George Pickford, do.	60
32	A. Hall Wilson, do.	58
33	Arch. Alexander, Her. Hosp. School,	57
34	George Robertson, do.	56
	Agnes Aikman, Madras Coll., St. Andrews,	56
	Wm. Anderson, Gordon's Coll., Aberdeen,	56
	Robert M'Kay, do.	56
38	James Cruden Knox, do.	55
	Jas. W. Harris, Madras Coll., St. Andrews,	55
38	Jas. Dan. Easson, Her. Hosp. School,	55
	Christopher M'Ardle, do.	55
42	Jas. T. Findlay, Gordon's Col., Aberdeen,	54
	Jas. R. T. Smith, do.	54
44	David Peebles, Waid Acad., Anstruther,	53
	John Cargill, do.	53
	A. Stuart, Gordon's Col., Aberdeen,	53
	Wm. J. Gall, do.	53
	Wm. White, Her. Hosp. Sch.,	53
49	Charles Skinner, do.	52
	J. A. R. Thompson, do.	52
	George Watt, Gordon's Col., Aberdeen,	52
52	James A. V. Thomson, Her. Hosp. School,	51
	Maggie B. Mair, Waid Acad., Anstruther,	51
	Wm. Bennet, do.	51
	Annie Wallace, Madras Col., St. Andrews,	51
	James Fairweather, do.	51
57	May Ramage, do.	50
	Reuben W. Linder, do.	50
	Findlay S. Douglas, do.	50
	David Boyter, Waid Acad., Anstruther,	50
	Johnina H. Todd, do.	50
	John Ferrie, Her. Hosp. Sch..	50
	David Black, do.	50
	R. Veitch Clark, do.	50
	James Kirkwood, do.	50
	Lewes Thomson, do.	50

List of Junior Examinations.

First Class.

1	Edwin Connon, Gordon's Col., Aberdeen,	85
2	Thomas Cargill, Waid Acad., Anstruther,	80
3	Wm. D. Ritchie, Gordon's Col., Aberdeen,	75

Second Class.

4	Gordon Ogilvie, Gordon's Col., Aberdeen,	70
5	Alex. F. M. Hay, do.	68
	Wm. Watson, do.	68
7	John Rothnie, do.	67
	Henry Jas. M'Grigor, do.	67

		Per cent.
9	Thomas Callander, Gordon's Col., Aberdeen,	65
	W. B. Anderson, do.	65
11	Jas. A. Jackson, do.	63
	John Philip, do.	63
13	Henry Hay Edie, Waid Acad. Anstruther,	57
14	Alex. Findlay Clyne, Gordon's Col., Aberdeen,	56
15	Jas. G. M'Lean, do.	55
16	Jas. Law Wishart, do.	54
17	Alex. Hay Allan, Gordon's Col., Aberdeen,	53
18	Mabel Sieverdin, Madras Col., St. Andrews,	51
19	Wm. Gordon Taylor, Gordon's College, Aberdeen,	50
	Helen Pittendrigh, Waid Acad., Anstruther,	50
	Alex. S. Calder, Gordon's Col., Aberdeen,	50
	Wm. Andrew Cameron, do.	50

Prizes.

The First Class Candidates in the Senior and Junior Examinations received Prizes and Certificates. The Second Class Candidates obtained Certificates only. The Atlases and Books awarded as Prizes were kindly presented to the Committee by the following firms: — Messrs. T. Nelson and Sons, Messrs. John Bartholomew and Co., Messrs. George Philip and Son.

Report of Examiner.

Edinburgh, 16th December 1890.

My dear Sir,—I herewith transmit to you the results of my Examination of the answers, written by 137 Candidates, from four schools, to the questions on Geography set by Mr. Jolly and myself. The small number of schools taking part in the Examination is matter of regret, and the absence of a greater number of candidates for the junior paper is also disappointing.

The Examination Papers were set with the object, less of ascertaining to what extent the memory was stocked with geographical facts, than of finding how far the scholars understood the meaning of the broad principles of Geography, and were able to apply these principles to the facts. Regarded from the point of view of routine-teaching, both papers were difficult; but neither should cause serious trouble to young people who had been thoroughly interested in their work. It is satisfactory to find that most of the questions were treated with great intelligence in the majority of cases, and gross blunders were rare. The value of contour-lines in expressing the surface features of the country on a map, and the meaning of different scales, have not been properly grasped by most of the candidates. While two or three of the maps drawn were almost perfect in accuracy and neatness, the map-drawing as a whole was unsatisfactory. The questions involving history and the relations between natural resources and population seemed, on the other hand, to be clearly understood, and were often answered in a thoroughly satisfactory manner. It would appear that rather less weight is given in instruction to the nature and meaning of maps, and to physical geography, than to the historical, commercial, and social bearings of the subject, and that in consequence the physical basis of all geography has been somewhat lost sight of.—I am, yours very sincerely,

Hugh Robert Mill.

W. Scott Dalgleish, Esq., M.A.,
Convener of Education Committee.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The Annual Business Meeting was held in the Society's Hall, National Portrait Gallery, Edinburgh, on the afternoon of Tuesday, 18th November, at four o'clock. Sir Thomas Clark, Bart., presided.

The Secretary (Mr. Silva White) read the Annual Report of Council, which was published *in extenso* in last month's Magazine. On the motion of the Chairman, seconded by Sir Robert M. Smith, the Report was adopted by the Society.

The Annual Elections were then proceeded with.

On the motion of Mr. Coutts Trotter, the following Resolution was adopted :—"(*a*) That his Grace the Duke of Argyll be re-elected President for the current Session ; and (*b*) that the Vice-Presidents of the Society be re-elected, and that his Grace the Duke of Montrose be elected a Vice-President of the Society."

On the motion of Mr. Grant Ogilvie, the following Resolution was adopted :—"(*a*) That the Honorary Office-bearers of the Society be re-elected ; (*b*) That, in the room of Ordinary Members of Council retiring at this time by rotation, the following gentlemen be elected to serve on the Council, namely :—Mr. John Geddie, Mr. H. M. Cadell, Mr. Ogilvy Dalgleish (Dundee), and Mr. Charles Robertson ; and that the following members of Council retiring by rotation be re-elected, namely :—Dr. W. G. Blackie (Glasgow), Principal Peterson (Dundee), Dr. Thomas Muir (Glasgow), Dr. Alex. Buchan, Mr. Scott Dalgleish, Sir Alex. Christison, Colonel Dods, Dr. R. W. Felkin, the Rev. George A. Smith (Aberdeen), Lord Provost Stewart (Aberdeen), Mr. Renny Watson (Glasgow), and Mr. Coutts Trotter."

This concluded the business before the Meeting.

On the afternoon of Thursday, 20th November, the Council held a Reception in the Society's Hall, which was well attended by members of the Society resident in Edinburgh. Dambmann's string-band performed a selection of music in the Central Hall, and tea was served in the Lecture Hall.

The Anniversary Meeting of the Society was held the same evening at eight o'clock in the United Presbyterian Synod Hall, Edinburgh. Dr. John Murray, Vice-President, presided, in the unavoidable absence of the President, the Duke of Argyll. Mr. E. G. Ravenstein delivered the Address on "Rivers, Plains, and Mountains," which we publish this month as our first article. On the motion of Professor James Geikie, seconded by Sir Robert M. Smith, a cordial vote of thanks was awarded to Mr. Ravenstein for his Address.

The Glasgow Branch of the Society held its Anniversary Meeting on the following evening, Friday, 21st November, at eight o'clock, in the Upper St. Andrew Hall. Mr. W. Renny Watson, Chairman of the Branch, presided. Mr. E. G. Ravenstein delivered an Address on "The African Lakes : a Chapter in the History of African Cartography," and, on its conclusion, received a hearty vote of thanks, on the motion of Sir Michael Connal, seconded by Mr. Robert Gourlay.

The Dundee Branch of the Society held its Anniversary Meeting on Monday, 24th November, at eight o'clock, in the University College. Mr. Julius Weinberg presided. Mr. E. G. Ravenstein delivered an Address on "Colonization and its Limitations." On the motion of Captain Clayhills Henderson, a cordial vote of thanks was awarded to Mr. Ravenstein.

The Aberdeen Branch of the Society held its Anniversary Meeting on the following evening, Tuesday, 25th November, at eight o'clock, in the Round Room of the Music Hall buildings. Professor Ramsay presided. Mr. Ravenstein delivered an Address on "Migration and Emigration," and was cordially thanked by the Meeting, on the motion of the Rev. George A. Smith.

GEOGRAPHICAL NOTES.

EUROPE.

Population of the United Kingdom.—According to the recently published Quarterly Return of the Registrar-General, the Population of the United Kingdom, in the middle of 1890, was estimated at 38,227,321 persons : namely, that of England and Wales at 29,407,649, of Scotland at 4,120,547, and of Ireland at 4,699,125.

Earthquake in the Highlands.—A shock of earthquake was experienced in the Highlands on the evening of 15th November last, followed by slight tremors later in the evening and on the following day. The disturbances appear to have originated at, or near, Inverness, in the great Caledonian Valley, spreading northward along the east coasts of Ross and Sutherland to Dunbeath in Caithness, west to Fort Augustus and Garve, east to Elgin, and south to localities in the north of Perthshire. Accounts are so confusing, and the time, as noted by several observers, is so loosely stated, that it is impossible to be sure of the direction of the earthquake. At Inverness it is said by some to have travelled from NW. to SE. Others, again, affirm that it was felt from S. to N. The first and most severe shock was experienced at Inverness at about 5.50 P.M. on the 15th November, and was felt throughout the whole town and neighbourhood, as well as on boats and vessels on the Kessock Ferry and Caledonian Canal. At Kirkhill, Inverness-shire, some damage was done to buildings. At Moy Hall the time of the first shock is given as about 4.45 P.M., followed by another half-an-hour later. At the same time it was experienced in Strathdearn. All these manifestations were accompanied by a loud noise, likened to the report of a cannon, to the rumbling of a heavy train or of a loaded wagon. A second shock at Strathdearn was unaccompanied by sound. At Redcastle the time of visitation was "about 6 o'clock," with a second tremor at 6.30 P.M. At Daviot a rumbling sound was heard, accompanied by an earth movement, both coming from the west, or north-west, and travelling eastward by the Craggie Hills ; and at Dunmaglass there can be little doubt that the direction was the same. Here the sound was distinctly audible for at least a minute. At Struy, in Strathglass, the noise and tremor were heard and felt at 6 o'clock, and on the following evening about 8 o'clock there was a loud rumbling, but no shock. At Badenoch the sound only lasted for a second or two, and the tremor does not appear to have been severe ; the direction was supposed to have been from east to north-west, and the time is stated to have been 5.50 P.M. At Glenurquhart careful observations were made, showing that the first shock took place at 5.49, and the second at 6.20 P.M., the direction being eastward. Here the accompanying noise was heard approaching and increasing in volume until the shock was experienced, when it gradually died away in the distance. At Beauly the shock lasted ten or fifteen seconds, followed by another exactly twenty-five minutes later, and by a third on the evening of the 16th. The two latter were very slight, and, it is thought, were it not for the severity of the first, would not have been recognised or noticed. The direction here was from south-west to north-east. Nothing is reported as to any sound having been heard. The time at Alness was 5.50 P.M., the tremor lasting for ten seconds, accompanied by a concussion like the discharge of ordnance. At Brahan Castle and Maryburgh the shock was preceded by deep rumbling—time, about six o'clock. All over the Black Isle the shock was severe and distinct, especially at North Kessock and Redcastle. Some slight damage was done to buildings in the district. At six o'clock a loud rumbling noise was heard at Dingwall, and immediately after a distinct movement of the ground was felt. A slighter shock was noticed,

especially in the surrounding district, on the next evening. In Ross-shire two shocks were felt at an interval of thirty seconds ; at Gledfield, Culrain, Inverhouse, and at Invershin, in Sutherlandshire, two minutes later. At Nairn the shock occurred at between ten and nine minutes to six o'clock, and was supposed to pass in a southerly direction. Here the phenomenon took the form of rapid jerks from side to side, and not of the usual undulatory movement.

It will be observed that the disagreement as to time and direction was very marked, but, upon the whole, it would appear that the general direction was from south to north-east. The shock was the most severe that has been experienced in the district since the year 1816.

ASIA.

Central Asia.—A journey through the Indo-Russian borderlands, made by a French merchant settled in Kashmir in 1889 and 1890, promises important results. From Kashmir he travelled to the Zarafshan, the upper course of the Yarkand river, and thence by Tung Mariom, Sari-kul, Tashkurgan, and the Karachunkar Pass to the Taghdumbash Pamir. Imprisoned by the Afghans in Wakhan, he escaped after some days, and crossed the Hindu Kush to Gilgit by the unknown pass, Karambar, which lies to the east of the Baroghil Pass, leading to Chitral, and of the Darkot Pass, leading to Yassin. It is the shortest route between Wakhan and Kashmir.

The brothers Grum-Grijmailo left Kuldja on July 3d, 1889, and crossed the Achal Pass to the small town of Jinkho, and thence entered the mountains and came to the river Khotuk-by. Then they descended to the high road, and reached Urumchi. They discovered that the best maps of the Thian Shan are in many respects faulty. The Kiityka Pass does not exist. The Mengete Pass leads from the basin of the Kash into that of the Khusta, and then the road turns, not to the north, but to the south-east, joins the road descending from the winter pass, Ulansu, and continues to the passes Keldyn and Yullus, or Zullus. To the north of this route rises the majestic group of the Dös Möghen-ora, which, with its diverging chains gives birth to the rivers Khorgos, Ulan-assu, Khusta (a very large stream), and others of less importance. The height of the Dös-Möghen-ora, a collection of six peaks, probably exceeds that of the Bodgo-ola, beyond Urumchi, and may be estimated at not less than 19,600 feet. It is covered with enormous masses of snow, but the glaciers, owing to the steepness of its flanks, are insignificant. Between Achal and Urumchi the Thian Shan forms an unassailable wall. The base of the northern slope, small in the meridians of Jinkho and Shikho, attains its maximum extension in the neighbourhood of Dös-Möghen-ora. The expedition visited several coal-pits, gullies where steam or smoke, with a strong smell of coal issued from hollows and clefts, and where sulphurous incrustations were seen. Almost all the rivers contain gold. The fauna is particularly rich in large vertebrates, but much poorer than the Pamir in birds and insects. Ten points were fixed by astronomical observations, and forty photographs were taken. After ascending the Bogdo-ola the travellers visited the oasis of Turfan and the country to the south of it, and then proceeded across a mountainous country to Khami.—*Petermann's Mitt.*, Bd. xxxvi., No. 10.

Eruption of a Mud Volcano.—The Hong Kong *Daily Press*, Sept. 18th, 1890, gave an extract from the Japanese *Official Gazette* describing an eruption of the Shiridoko sulphur mountain, near Tone-mura, in the province of Kitami. After remaining quiescent for nearly twelve months, the crater began, in July last, to throw out ash-coloured mud, which, at the period of greatest activity, rose to a

height of fifty or sixty feet, and was carried by the wind to a distance of 400 or 500 yards. The discharge ceased altogether from July 18th to the 28th, when an eruption, accompanied by a loud report, took place. Sulphur of a dark greenish colour was ejected, the greater part of which flowed into the sea, while the remainder, cooling down into a solid state, covered about four acres of ground around the crater to a depth varying from five to eighteen inches.

Sumatra.—An account is given by Baron von Brenner-Felsach in the *Mitteil. der K. K. Geogr. Gesell. in Wien*, Bd. xxxiii. Nos. 5-6, of journeys made by him in the independent Battak lands, and in the island of Nias. He set out from Deli on 18th March 1887, and ascended, in four days' march, to the table-land which the Battaks inhabit, and where the Toba Lake lies. After passing through the coffee and tobacco plantations around Deli and a belt of grass-land and forest, Herr von Brenner had to ascend with great toil the slopes of the mountain ridge which forms the backbone of Sumatra. The latter part of the ascent was made along the bed of the Petani river, where a sulphur spring at a temperature varying between 82° and 86° Fahr. was passed, and the plateau was reached close to the still active volcano Si Baiyak. No forests grow here, but only clumps of trees around the villages. Nearly in the middle the Lau Biyang, or "Dog River," flows from east to west and drains the plateau, which is begirt on all sides, except the south-east, by lofty hills. The district which Herr von Brenner first entered was the country of the Karo Battaks. They are not cannibals like some of their kinsmen, and are more amenable to foreign influence. The first village reached was Berastagi, surrounded by trees and well-tilled rice fields. A palisade with one or two inconvenient openings protects the houses, which stand detached, and are placed either north and south or east and west, but are not drawn up in regular streets. They are rectangular, and rest on piles 6 to 12 feet high. The walls, not much more than 4 feet high, lean outwards. The high roof spreads out towards the ridge, so that the latter projects far beyond the ground plan. It also curves upwards to the gable ends, which are ornamented with buffalo heads and horns. Before the door, which is in the shorter side, a balcony is made, to which a ladder or a notched bamboo gives access. The interior of the house is a single large room, and is always dark owing to the absence of windows. It contains two to four fireplaces for the use of the four to eight families who inhabit it. The houses are often decorated with paintings, the most common colours being red and white, though blue and black are also seen occasionally, and in the houses of the chiefs, especially near the Toba Lake, the beams and pillars are carved. Underneath the houses are stalls for buffaloes, pigs, cattle, and horses. Each village is independent, and has a chief of its own with the title of rajah, *pangulu*, or *tuvan*. He is the commander in war, but civil matters are decided by the popular assembly of which he is president. At Kaban Jahe Herr von Brenner witnessed a fight between the men of that village and their enemies of Linga. Hundreds of warriors were posted opposite one another, protected by low ramparts of earth. All day long the overloaded guns were being discharged, nearly overturning the marksmen by their recoil but doing no injury to the foe, and when night put an end to the combat not a drop of blood had been shed. On Herr von Brenner's return, some days after, from an excursion in the neighbourhood, the war was still raging, the women standing in the rear and cheering on the men. At length a downfall of rain put an end to the bloodless combat. At another village a market was being held, and the traveller had a favourable opportunity of observing the dress of the natives and the merchandise of the country. Besides native products, such as rice, maize, tobacco, chickens, palm wine, and blue cloth, there were a good many articles of European

manufacture—linen, matches, and coloured cloth. The scene was deficient in colouring, for the dress of the people is chiefly blue. It consists of a dark blue *sarong*, falling to the ankles, and a cloth of the same colour thrown over the shoulders. On the head the men wear a coloured cloth wound round like a turban, and the women a blue cloth projecting over the face and forming a point at the back. Earrings of gold, silver, ivory, shells, and brass, and bangles of gold and silver are worn.

Marching southwards, Herr von Brenner came to the village of Pengambatan, pleasantly situated in a valley sloping down to the north-western shore of the Toba lake. Here, in the house of the chief, he met a cannibal chief, a pleasant-looking man, who informed him that he and his people had eaten up eleven Chinese in the past six months, and that his favourite morsels were cheeks, ears, and thumbs. The Toba lake is a fine expanse of water stretching towards the south-east. Towards the southern end lies a large, hilly island, with high and steep shores indented with numerous bays. The lake on either side the island is narrow, and, on the western side, so shallow that it can be forded when the water is low. A volcano, which stands close to the shore, is probably the cause of this shallowness. At the upper end of the lake a hammer-shaped peninsula juts into the lake. From Pengambatan Herr von Brenner marched south-eastwards to Negori, in the land of the Timor Battaks, where he procured a boat to take him down the lake. Skirting the shores of the island, he landed, after a passage of three and a half hours, at Amberita. Here every village is surrounded by a wall of earth or stone, surmounted by a hedge of quick bamboos. Cultivation is limited to the production of the absolutely necessary supply of food, for in this land of cannibals no man's life is safe outside his village. Owing to this insecurity great difficulty was experienced in procuring a boat and rowers, and when at length the party was landed at Loutong, further down the coast of the island, the crew piled the baggage on the shore and made off as fast as they could. Herr von Brenner and his companions were here imprisoned for three days, and would certainly have been killed and eaten, had they not charged the chief with the intention of attacking them as he was preparing to put his plan into execution. Such foreknowledge the chief took to be a sign of supernatural power, and he not only released the party, but provided them with a boat. After experiencing various dangers from storms on the lake and cannibals on shore, Herr von Brenner landed at Laguboti in Dutch territory.

In May of the same year Herr von Brenner landed at Gunung-Sitoli in the island of Nias, of which some account is given in the *Scot. Geogr. Magazine*, vol. iv. p. 217. It is about 75 miles long by 28 broad. The northern and southern parts are inhabited by peoples of very different types. The houses of North Nias have an elliptical ground-plan and, like those of the Battaks, are built on piles and have low walls sloping outwards. The interior is divided into several apartments, of which the largest is assigned to the use of the men. The walls and the open space under the roof are adorned with idols of very rough workmanship. Underneath the houses are kept pigs, the number of which indicates the wealth of the occupier. Rice and sweet potatoes are grown, and, with coconuts, form the principal food of the natives, pigs being killed only on festive occasions. The dress consists only of a small apron and a jacket, worn as a protection from rain, and, in the south, the women sometimes wear a *sarong* reaching to the ankles. All along the coast dwell Malays engaged in the cultivation of coconuts and nutmegs. On reaching Hellera, Herr von Brenner turned into the interior along paths crossing one ridge after another. He was well received by the natives at the large village of Madula, and a feast was given in his honour by the *Saluva*, or

chief, who adorned himself for the occasion with all his golden ornaments, for which he is famed—a jacket, trimmed with gold tinsel, a hat-shaped crown, broad bangles, huge earrings, and a moustache of gold—an ornament peculiar to Nias. Herr von Brenner found the southern part of the island more interesting. Here, instead of the dangers predicted by the Dutch officials, he met with a warm welcome from the head-hunting chiefs. Hiring a Chinese junk, he sailed along the east coast and landed in the bay of Tolok Dalam, where the chief of Bavo-Lavalani received him with an escort of armed men. The path to this village, which, like all the settlements in South Nias, stands on a hill, is paved with large flags, and here and there benches of stone are placed under the shadow of large trees. The houses of the village are rectangular, and stand on either side of a broad, straight street, which is paved with stones, with gutters and raised pavements on either side. A ladder leads to an opening in the side, or sometimes in the floor, of the house, through which one enters into the large front room where the men live. Towards the street a grating of wood lets in light and air. A bench on a raised platform extends along one side of the room, and opposite to it is the fire in a large recess, where dogs lie chained up. On the walls are idols, fewer in number than in the north of the island, and excellently carved. The rest of the house consists of private apartments, of which one is appropriated to the use of the women, and store-rooms. Before the house of the chief stands the forum where councils are held at night. Stone benches form a rectangle in which are left two or three openings. On one of the shorter sides stands a stone throne for the chief, flanked in many cases by obelisks. The men of Nias are eloquent orators, sometimes speaking with calmness and dignity, and then again rousing the hearers by their enthusiasm. The king of Orahili, the most important village of South Nias, sent a troop of twenty-one men, all wearing the collar of polished coco-shell which signifies that the wearer has cut off a head, under the command of the second king, to invite Herr von Brenner to his village. The path was paved and furnished with benches, and terminated in a steep stone staircase leading to the gate of the village. The house of Laubo, the grey-headed, one-eyed, king is of vast dimensions and rests on colossal piers. On the front are three dragon's heads carved in wood, with protruding tongues coloured red, and between these are seven carved and painted figures of warriors. Before the house stand two well-executed obelisks 13 or 14 feet high. The interior is clean, and the polished walls are adorned with fine carving. The king is rich, and possesses an arsenal of fifty guns and blunderbusses and a valuable collection of jewelry. Opposite the king's residence stands the court-house, in which hang rows of skulls, some rendered still more ghastly by artificial beards. Skull houses of smaller dimensions are common throughout South Nias. Outside the village stands a bath lined with flags of stone and fed by a stone conduit. On the way from Orahili to the bay of Lagundi Herr von Brenner passed a cemetery. The corpses are not buried, but are placed in coffins tied with rattan on high posts, and left to dry up. Ten thousand bodies were said to be deposited at this cemetery. At Lagundi Herr von Brenner regained his junk and sailed to the Nakko Islands, a group of seven lying off the west coast near Cape Serumbu, and, after visiting some of the islands, landed at the cape and crossed on foot to Gunung-Sitoli.

AFRICA.

The Benué and Shari.—Barth expressed the opinion that some connection existed between these rivers through the Tuburi swamp. The experience of an expedition sent up the Benué by the R. Niger Company would appear to negative this

assumption. The steamer in which the party travelled ascended the Mayo-kebbi, which enters the Benué at Ribago, until it became so narrow that the vessel could not turn round. It may, therefore, be concluded that this point, which lies far from the Tuburi swamp, is at no great distance from the source of the river. The country through which the Mayo-kebbi flows is mountainous, and, for the first twenty miles above Ribago, uninhabited.—*Petermann's Mitt.*, Bd. xxxvi. No. 10.

Somál-land.—Signor Luigi Brichetti-Robecchi has travelled from Obbia to Halule, a distance of about 560 miles, with the object of opening a trade route between these ports. He describes the country (in the *Boll. della Soc. Geog. Italiana*, vol. iii. fasc. x.) as a series of desert lands, much diversified, and valleys and plains, more or less wooded, where fine grey limestone is the predominant rock. Occasionally luxuriant vegetation was met with, ostriches, monkeys, and abundance of game, both quadrupeds and birds. After crossing the Kolule river he arrived at the Wadi Nogal, at a distance of over 230 miles from Obbia. This channel, which is known under several different names, contains in the lower 12 miles of its course, where it is called El, and for some distance above, an abundant supply of water. It is encumbered with large masses of displaced rock, and its banks are lined with rugged bastions. As the stream is ascended, the vegetation becomes more luxuriant, pastures and cattle are more numerous, and wild animals—elephants, lions, leopards, etc.—are frequently met with. Fine specimens of palms, acacias, and sycamores cover the bottom of the wadi and soften the ruggedness of the scene. After crossing the next watercourse, the Wadi Dhalo or Dra Sala, Signor Brichetti-Robecchi found water scarcer and the country more stony. In the basin of the Amudah he observed for the first time dense thickets of the Dum palm, and in the succeeding Wadi Dhudo these and date-palms grow in large numbers, intermingled with wild vines and several kinds of fruit-trees. The whole route traversed much the same kind of country—dry, rocky, sandy plains intersected with wadis, where mangroves, palms, *salvadora*, etc., grow freely. Signor Brichetti did not penetrate far into the interior, having only a small caravan, incapable of carrying supplies for a long period. Two days after leaving Obbia he was attacked by a horde of wandering Somál, and suffered the loss of one man and his horse, but elsewhere he was kindly received by the natives, and was able to study the manners and customs of the Mijertain. He also took observations for altitudes, and paid special attention to the meteorology of the country.

Ostrich-Farming.—The following details are extracted from an article by Signor Augusto Carpani, Italian Consul at Cape Town, which appeared in the *Boll. della Soc. Africana* (*Napoli*), Sept.-Oct. 1890. The number of these birds domesticated in the colony he estimates at 150,000, whereas in 1865, when ostrich-farming was first started, there were only 80. The age of the bird may be ascertained by the colour of the feathers, those on the back and breast turning to black, or nut-brown, as the bird approaches the age of four years, when it attains its full development. The legs and beak also become red. The feathers should be cut every six months. The best method is to cut off the feather close to the skin before the lymph dries up, leaving the quill for a couple of months longer. The feathers deteriorate when they are allowed to remain longer on the bird, while the extraction of the quill before it is ripe is prejudicial to the next crop of feathers. Each bird yields about one pound of feathers every season, on an average, the crop being more valuable as the bird grows older. Thus, a bird of one year old is worth about £22, and at four years old about £50, after having produced annually feathers to the value of about £10. The average price of feathers has fallen from a maximum of £8, 12s. per lb. in 1860 to £2, 5s. in 1890. Increased production is usually accompanied by a fall in price,

but Signor Carpani attributes this fall in part, at least during the last eight years, to neglect of proper precautions in cutting the feathers, and to the practice of cutting as many as possible in order to procure a large immediate return, whereby the market has been glutted with feathers of inferior quality. The quantity exported from Cape Colony in 1886 was 286,300 lbs., and since then it has diminished, being 257,950 lbs. in 1888, and 107,000 lbs. in the first half of 1889. It is possible that the introduction of a better system is hereby indicated. The value of the feathers annually exported from Natal is about £12,000.

AMERICA.

The Eastern Slope of the Andes between the Rio Diamante and the Rio Negro.—In 1887 Dr. Kurtz, Professor of Botany at the University of Cordoba, Argentine Republic, and Dr. W. Bodenbender, were sent out by the Geographical Institute of Buenos Ayres to explore this tract, and the latter has given a preliminary sketch of the geological formation, etc., of the country in *Petermann's Mitt.*, Bd. xxxvi. No. 10. Civilisation ends at the small town of San Rafael, on the Rio Diamante. To the south of that river lies an almost deserted territory of considerable interest from a geological point of view. The first point Dr. Bodenbender notices is the occurrence of isolated masses of archaic slates, with granite, amidst the Jurassic formation, a phenomenon probably to be seen also on the plateau between the rivers Neuquen and Lamay and throughout Patagonia. The Silurian formation occurs in the western spurs of the Cerro Nevado, in the neighbourhood of Tundrigua—probably its southern limit. Numerous strata of sandstone and conglomerate of doubtful age are to be found on the Andes and their skirts. Three different horizons may, in Dr. Bodenbender's opinion, be distinguished. The oldest sandstones and conglomerates exist in the Rio Grande, in conjunction with diabase and melaphyre (?). The second horizon is formed of sandstone containing gypsum, which may belong to the Rhætian or Triassic formation, but at any rate contains strata with pre-Jurassic fossils underlying others of the Jurassic period. These rocks cover the greater part of the eastern slope of the Andes from Mendoza to the Rio Lamay. The supposition of several travellers that certain sandstones on the Argentine side are of Tertiary origin has not yet been supported by adequate proofs. The strata containing Jurassic fossils are of very diverse character—grey and marly sandstones, black limestone, conglomerate limestone, slates, sometimes bituminous, white limestone, etc. The most southern point they were found at is the confluence of the Rio Catanlil and Rio Collon Curas. The palæontological collection, handed over to Professor v. Koenen of Göttingen for inspection, is very extensive. Dr. Bodenbender gives a list of the more important species and numerous petrographical details. Near the sources of the Rio Agrio stands the volcano Copahue, on the flanks of which numerous hot springs and solfataras give evidence of great activity in former ages. This place may before long become the most renowned health-resort of Argentina. The general surface of the country is formed of plateaus, intersected by valleys, produced by the splitting asunder and falling-in of the ground. Where gypsum abounds, its solution may have contributed to the formation of these valleys, and in the neighbourhood of the Cerro Colorado earthquakes may have assisted, as is indicated by the name of the route, "Camino de los Terremotos," which passes near it.

Dr. Bodenbender gives the following notes on the general meteorology of the country. The prevailing winds blow from the west or north-west, and from the south or south-west. The NW. winds are usually very violent; the SW. winds bring cold weather in winter and frequent storms in summer. The lowest tempera-

ture, in July and August, is 16° F. in San Rafael, 14° F. in Villa Beltran, 9° F. in Ñorquin, and 10° F. in Junin de los Andes. In summer the thermometer rises to 104° F. Snow falls in all parts, but seldom lies long. As in geological, and still more in hydrographical and meteorological characteristics, so also in scenery and quality of the soil the northern part of this tract presents a striking contrast to the southern. Whereas the rich lake district of Junin de los Andes abounds in water, woods of beech, cypress, araucarias, and apple-trees bearing most delicious fruit, on rich marly soil, the north exhibits chains of mountains, devoid of vegetation, and narrrow valleys choked with stony *débris*, where swiftly rushing streams prevent the accumulation of good alluvial soil. The whole country stands in need of more channels of communication. Two railways are already projected, the one traversing the department of La Pampa and following the river Neuquen until it crosses the Andes at the latitude of Chus-Malal, the other from Bahia Blanca to the Rio Negro and on to Nahuel-Huapi. The commerce is concentrated at a few small places—Codihue and Ñorquin on the Rio Agrio, and Chus-Malal on the Rio Neuquen. Ñorquin, being situated near three easily traversed passes leading into Chile, in a broad, well-watered and well-wooded valley, and having communication with the south by means of the river, has, no doubt, a prosperous future in store. At present the commerce is chiefly with Chile.

AUSTRALASIA.

The Musgrave Range: South Australia.—In the summer of 1889, Mr. Henry Y. L. Brown was sent out by the Government of South Australia to explore this range, which lies in lat. 26° 15′ S., and long. 131° 40′ E. Mr. Brown travelled by rail as far as Warrina, at that time the terminus of the transcontinental line. The distance from this place to the eastern flank of the Musgrave Range is 312 miles. The route at first traversed already explored country, over hills of red sandstone, with a strike running from north to south. After passing the Lora not far from its junction with the Akaringa Creek, Mr. Brown advanced to the north-west, and followed the latter stream for a distance of 78 miles. Its bed, through which the water flows in two or three channels, is nearly two miles wide where Mr. Brown first struck it, but gradually contracts as it ascends between stony flats and hills, until at length it is enclosed by precipitous walls 200 feet high. Further on the creek divides into several streams, flowing down from scrub-clothed table-land at an elevation of 1300 feet. Chalk rocks, partly underlying red loam and sandy beds of Tertiary origin, extend for a distance of 140 miles from Warrina, until they terminate in a flat-topped range of quartzite and sandstone lying horizontally. From the Arcoolinna Well (three shallow springs of rather bitter water with a flavour of magnesia) to a "soakage" (watery spot) on Indulkana Creek, the quartzite and sandstone form high, steep, bluffs, rising to a height of 650 feet above the surrounding country, such as Mount Johns and Mount Chandler, the intervening flats being covered with deposits of red sand and loam, through which limestone, slates, and other rocks crop out. As the Musgrave Range is approached, eruptive, metamorphic, and porphyritic granite present themselves. The range stretches from east to west for a distance of 100 miles, with an average breadth of 20 miles. Its highest summit, Mount Woodroffe, lies in lat. 26° 18′ S. and long. 131° 48′ E., and rises to a height of 2398 feet above its base, and 5228 feet above the sea-level. On the summit eucalyptus grows, while the flanks are covered with *Spinifex*. The next highest points are Mount Ferdinand and Mount Cuthbert, which rise to 3618 feet above the sea-level. The range is not continuous, the summits being separated by narrow flats, or connected only by saddles of low elevation, some of them

not more than 100 feet high. Several so-called gum creeks—that is, beds filled with sand in which the water disappears as soon as it leaves the rocky substratum —drain the slopes of the range. The rocks of which it is composed are eruptive and metamorphic granite, containing a large proportion of hornblende and but little mica, with intrusive diorite and dolerite. Magnetic iron is present in such quantities as to cause a marked deflection of the needle.

The natives are numerous in the mountains, and are amicably disposed towards white men. The men are, in general, of superior build to those of the plain. They wear no clothing, and at night keep themselves warm by sleeping between two fires or crouching behind bushes. Their weapons are shields, spears, eight to nine feet long, and *waddies*. Red kangaroos are common on the adjoining plains, and euros on the mountains. Pigeons of various kinds and a few parrots are occasionally seen, but no cockatoos. Lowans' nests are plentiful, but the bird itself is seldom seen. It is about the size of a turkey, and lays its eggs in a heap of sand. The largest trees, red gums (*Eucalyptus rostrata*), grow in the sandy beds of the creeks, and a tree 30 to 40 feet high and resembling a willow is frequently met with in the loamy soil at the base of the mountains. Various herbs and grasses, the wild geranium eagerly devoured by cattle, the salt-bush (*Artiplex nummularia*), blue-bush (*Kochia sedifolia*), and cotton-bush nearly complete the list of the forms of vegetation. On his return Mr. Brown retraced his steps as far as the "soakage" in Indulkana Creek, then, turning eastwards, marched thirty miles to the Alberga, which he followed for some distance, and, finally, passing Angle Pool, beside Mount O'Halloran, reached Warrina on October 7th.—Henry Greffrath in *Petermann's Mitt.*, Bd. xxxvi. No. 10.

The Finisterre Mountains in German New Guinea.—Herr Hugo Zöller made an expedition to this range in October 1888, and has published some of the results in *Petermann's Mitt.*, Bd. xxxvi. No. 10. The spurs of the Finisterre Mountains do not, as was supposed, extend to the sea, but between this range and Astrolabe Bay is interposed a lower range, having an average height of 1200 or 1500 feet, and a maximum height, probably in the Kubary peak, of about 2500 feet. The northern flank exhibits yellow sandstone, in some places calcareous and in others argillaceous, from which Dr. Helwig, who was one of the party, extracted some very fine fossils, while on the long, narrow plateau, lying more to the south, between Kadda and Tsiringi, conglomerates and tuffs are found. On the Finisterre range eruptive rocks, such as porphyry, andesite, trachyte, etc., were discovered. Its volcanic origin, thus indicated, cannot, owing to the effects of erosion, be detected by its outward appearance. Beyond the Finisterre range rise the Kraetke Mountains, and beyond these again the Bismarck chain, which sweeps in a long curve in the direction of Finschhafen. Its highest point, the Otto Mountain, is probably the loftiest elevation in the German territory. This, as well as the other peaks of the group, are concealed from the coast by the intervening Kraetke range, the highest summit of which was named by the explorer after himself. The chief characteristic of this mountainous country is the narrowness of the ridges and valleys, and the consequent steepness of the slopes. The top of the main ridge of the Finisterre mountains barely afforded the travellers sufficient room to encamp on. Although many other questions were solved during this expedition, it still remains a mystery where the large quantity of water that descends on to this mountainous region during the rainy season is discharged. The streams which, like the Kabenau river, descending from the longitudinal valleys of the Finisterre Mountains, force their way through the coast range, are merely rushing torrents ; while from the Kaiserin Augusta and Ottilia rivers south-eastwards, to some dis-

tance beyond Finschhafen, no large rivers have yet been discovered. Dr. Helwig's valuable botanical collections were, most of them, lost, and it is not yet known whether the botanist was able to draw up a report before his death, which occurred shortly after his return. It is, however, Herr Zöller's opinion that the dense forests of the Finisterre range consist of trees all of the same, or of very similar, species. Around their straight and lofty trunks a host of parasitic plants twine their tendrils, giving place in elevated situations to long-bearded mosses, while the ground is covered nearly everywhere with bushes and plants of the most varied forms. Palms became rarer as the travellers ascended; wild bananas and taro were found up to quite half the elevation attained by the explorers. While the flora of the mountains is distinguished from that of the coast by its great uniformity, the fauna exhibits the same extraordinary abundance of brilliantly plumaged birds and the same scarcity of quadrupeds. Parrots, cockatoos, and delicately-flavoured crested pigeons may be shot, and an enormous snake; herons and birds of prey are eaten by the natives. Numerous footprints of wild boars and cassowaries were noticed. Near the coast the natives live in widely-scattered, well-built, villages. After passing an uninhabited belt the travellers met with the inland natives, who greeted them with flights of arrows. They are nomads, and live entirely by the chase. The higher mountain districts, between 3600 and 5400 feet, are seldom visited by these nomads, while above the latter height no trace of the presence of human beings was noticed. Their absence may be explained by the fall of temperature; the thermometer, which marked 95° F. when Herr Zöller left the coast, sank to 46° F. at an elevation of 8725 feet.

MISCELLANEOUS.

The *Mitt. d. K. K. Geog. Ges. zu Wien*, states that Signor **E. Modigliani**, known as the explorer of Nias, started in July for **Sumatra**, where he intends to explore the neighbourhood of the Toba Lake.

Dr. Oscar Baumann has extended his surveys beyond the **Usambara Country**, to the foot of Kilima-njaro on the north, and across the Pangani river on the south, and has thus furnished a surer basis for the observations of Last, Fischer, Stuhlmann, and Pfeil.—*Petermann's Mitt.* Bd. xxxvi. No. 10.

M. Cholet, a French official, has followed the **Sanga River**., discovered by G. de Brazza, as far as 2° 50′ N. lat. and 16° 20′ 9″ E. long., and confirms the opinion of de Brazza as to its length and importance. It flows into the Congo between the Likuala and M'bangi. Its tributary, the N'goko, M. Cholet ascended to 3° 30′ N. lat.—*Petermann's Mitt.* Bd. xxxvi. No. 10.

The Imperial Academy of Sciences in Vienna intends to send out a **Deep-Sea Expedition to the Levant.** It is to sail from Pola at the end of July, and to commence its investigations in the Cretan waters. The scientific staff will be composed of Dr. von Marenzeller and Professor Grobben (zoology), Professor Luksch (physics), and Dr. Natterer (chemistry).—*Mitt. der K.K. Geog. Gesell. zu Wien*, Bd. xxxii. No. 7.

It was reported in the *Revue de Géographie*, November 1890, that **M. de Brettes**, who lately attempted to cross the Chaco, was on the eve of sailing for Grand Bassam, with the intention of marching through Kong, Say on the Upper Niger, Sokoto and Zinder to Barua on the north-western shore of **Lake Tsad.** His object is to open up new routes for commerce in this part of Africa, which has lately been placed within the French sphere of influence by the Anglo-French treaty.

The commerce of **La Rochelle**, which is now three times as large as it was thirty years ago, has necessitated the formation of a **new Port** capable of receiving vessels of heavy tonnage. The site chosen is the roadstead of La Pallice, about 2¾ miles from the town. It is admirably protected against tempests by the islands of Ré and Oleron, and is connected with the open sea by the Pertuis Breton and the Pertuis d'Antioche. The port consists of an outer harbour, enclosed by two jetties, each about 460 yards long, and a basin covering 28½ acres. The total length of the quays is 1250 yards.—*Boll. del Ministero degli Affari Esteri*, vol. ii. fasc. iv.

The *Mitt. des Vereins für Erdkunde zu Leipzig*, 1890, contains a useful article by Dr. Ludwig Hösel on the **Cereals of North and Central Africa.** The author gives the different botanical names for the same plant, and discusses the signification of the ordinary names as employed by travellers. The distribution of each plant is determined by numerous references to the works of well-known explorers, and the methods of cultivation and modes of preparing for consumption the cereals in use among the native tribes are described. The necessary temperature, atmospheric moisture, and soil find also a place in the article. Lastly, a map showing the limits of the various cereals is appended.

In a letter to *The Times*, on October 27th, 1890, Mr. H. M. Stanley stated that the formation of the **Congo State** cost King Leopold about £350,000. After the Conference of Berlin the annual **Expenditure** of the State was borne by the King, with the exception of about £20,000 derived from taxes. This expenditure increased from £80,000 to £120,000 annually, and in 1887, owing to the cost of new and powerful steamers, new stations, and the equipment of a native force, it rose to £170,000 annually. To meet these demands the State receives £40,000 from the King, £80,000 from the Belgian Government, and £25,000 from export duties, etc. There is, therefore, a deficit of £25,000, which the new taxes, now proposed, are to make good.

NEW BOOKS.

The First Crossing of Greenland. By Fridtjof Nansen. Translated from the Norwegian by Hubert Majendie Gepp. With Maps and numerous Illustrations. London: Longmans, Green, and Co., 1890. 2 vols. Pp. 510, 497. *Price* 36*s.*

If, during the long delay in the publication of Dr. Nansen's narrative, public interest in his intrepid feat of exploration may have declined, it will undoubtedly be revived by the appearance of the two handsome volumes recording "the first crossing of Greenland." In many respects no more valuable and interesting volumes of travel have been issued from the press for many years. They record an adventurous Arctic journey which was undertaken in the face of its acknowledged conditions: renown for its success, and death in its defeat. Dr. Nansen and his brave companions accepted these conditions fearlessly, and it is only just that they should receive such rewards as the world has to bestow on them. If our admiration for them could in any way be heightened, it would certainly be stimulated by the two volumes before us. Dr. Nansen's narrative leaves on the reader a healthy impression that few works of travel are able to accomplish. His indomitable pluck and dash, his transparent honesty and good fellowship, his keen sense of humour and honour, and his cool, calculating judgment, no less than his modesty and unselfishness, are conspicuous on every page. He is a born leader of men, and

one who can inspire courage and devotion in his followers. Well equipped by nature in the physical and mental endowments that are essential to a successful explorer, it is obvious that any fresh enterprise he may undertake will be carried through to the end, whatever that end may be, and, if success be possible, that success will be his.

It is evident that the short journey across the inland ice of Greenland could not afford sufficient material for two volumes, each of about 500 pages. But Dr. Nansen has taken a comprehensive view of his subject, and, whilst recording minutely every stage of his journey, has trusted to the interest thereby roused in the mind of his reader. He gives us several chapters that have a direct bearing on "the first crossing of Greenland," although not recording the deeds of the expedition he himself commanded. Of such, we have a chapter dealing with the Norwegian national sport of *skilöbning*, because it was by the use of *ski* that Greenland was crossed. We have also a critical account, in more than one chapter, of previous attempts to reach the East Coast and to penetrate the unknown Inland Ice : the history of exploration in Greenland is, in fact, given in a concise form, and is in itself most valuable to English readers. A popular account of Greenland and the Greenlanders is also added, and, although containing nothing fresh, except to English readers, is very suggestive and entertaining. Dr. Nansen's charm of style carries the reader's interest with him to the end ; it is absolutely devoid of self-consciousness, like the man himself. In this respect a special word of praise is due to the translator ; no higher commendation could be given to him than the acknowledgment that, unless informed of the contrary, the reader might reasonably have assumed Dr. Nansen's work to have been written in English in the first instance. The greatest care, too, has been given to the revision, while the maps accompanying the text are admirably and clearly reproduced. The numerous illustrations are perfect in their way, and greatly add to the value of the work.

The main incidents in Dr. Nansen's expedition are too well known to need recapitulation in this place. He himself gave an account of his journey at a meeting of the Royal Scottish Geographical Society in 1889, and his paper was published in our Magazine (vol. v., p. 393). The scientific results are briefly discussed by Dr. Nansen in the appendices to his book. Considering the difficulties under which they were obtained, it must be confessed that his observations, and those of his companion—Lieutenant Dietrichsen—were extremely creditable. Of their general value there cannot be two opinions ; but Dr. Nansen holds views of his own, not altogether orthodox. His theories in regard to glacial phenomena in Greenland require, more especially, a closer criticism than we can at present afford him ; but we hope to discuss them in a special article next month.

We predict a wide popularity for this absorbing and entertaining work of travel no less than credit for its more solid properties as an invaluable medium of reference to all that concerns Greenland.

The Development of Africa. By Arthur Silva White, F.R.S.E., Secretary to the Royal Scottish Geographical Society. Illustrated with a set of 14 maps specially designed by E. G. Ravenstein, F.R.G.S. London and Liverpool : George Philip and Son, 1890. Pp. xiv + 343. *Price* 14*s*.

The following abstract will indicate the scope and nature of this book, and the method of treatment adopted by the author. In effect it is a study in Applied Geography.

The earlier chapters contain a sketch of the salient geographical features of the continent, its physical structure and configuration, its river-systems and lakes. The relative value of these physical features, and the supreme importance of

the climatic conditions, especially in so far as they influence Europeans, are duly dwelt upon. An outline of the prevailing ethnographical relations of the continent forms an introduction to the politico-geographical chapters that constitute the latter half of the book. The ultimate or fundamental principle underlying the work may be expressed thus : The development of Africa must follow strictly on natural lines—the lines that are determined by the permanent geographical, climatic, and ethnographical characteristics of the continent, read in conjunction with the unalterable facts of the historic past. Working from and with these premises and fixed conditions, the author arrives at the subjoined conclusions. Political settlement in Africa is confined to the oceanic drainage-basins. Europeans were at first restricted to the coast regions, being checked in their attempts to penetrate inland by the cataracts and rapids that hinder navigation where, at short distances from the coast, the great rivers break through the outer rim of the inland plateau : for European enterprise naturally sought to utilise the rivers as the most direct means for penetrating into the Interior. But on the coast the climate is inimical, often fatal, to Europeans ; hence another, and more formidable, deterrent to the extension of their settlements inland. A third class of obstacles fencing in the interior of Africa is the deserts—the Nubian, Libyan, and Saharan deserts, and the barren steppe regions of the East, West, and South-west coasts. Eventually, however, as explorers and travellers traced out the great fluvial highways—Niger, Nile, Zambezi, Congo—these obstacles have been rapidly overcome. The principal inland routes are plainly indicated. The Sahara caravan-route, for example, is less feasible than that by the Niger ; the Lower Nile route is less serviceable than those from the Red Sea or the East Coast ; the Zambezi and Great Lakes route is preferable to that by the Congo ; whilst the best route of all is that which starts from Cape Colony and joins the Great Lakes. But though Europeans cannot, without taking unusual and long continued precautions, establish themselves permanently on the Tropical coasts, they can live in the high-plateau regions of the Interior, especially in the south of Africa. It is in those regions, inhabited by impressionable Bantu races, that Europeans have obtained the surest footing ; the northern parts of the continent having fallen under the dominion of Mohammedan races. The methods of conquest employed by the Arabs have not materially differed in their action from those employed by Europeans. As the former are associated by us with the Slave Trade, the latter are associated in the native mind with the traffic in spirits. The causes which have favoured the success of Islam and counteracted the progress of Christianity have been chiefly these : Islam has been in the field so long that it is virtually an indigenous force ; it is more easily understood by the native populations, and possesses the power of assimilating them through its institutions ; whereas Christianity puts before them conceptions and standards of conduct which are too high for them, and the practices of irresponsible traders have been contradictory of, and diametrically opposed to, the teaching of Christian missionaries. Nevertheless the Christian faith has made some progress among Bantu tribes, and, were it not for the rivalries of the different European nations, that progress would have been more marked. The chief support of Christian missions is the presence of a strong and effective European Government. The great Powers of Europe who take an interest in the Dark Continent are therefore appealed to earnestly to put a stop to the iniquitous traffic in cheap poisonous spirits. The Slave Trade can be best suppressed by encouraging legitimate commerce, for by itself it does not pay ; it is only when worked in conjunction with the ivory traffic—as being the leading commercial product—that it can be made to pay. All slave-routes are coincident with well-established trade-routes. Commerce,

therefore, is the ruling factor in African politics, and the extension of commerce—legitimate commerce—will be the most potent instrument for opening up the continent, developing it, and effecting its civilisation. All those regions of Africa which possess mineral resources or abundant supplies of leading commodities like ivory can be profitably developed, and will at once yield a good return for any capital invested. The best agency for pioneer efforts is the chartered company ; it effects its mission through the instrumentality of commerce, and it can advance in a way, and by methods, it would not be expedient for a European government, whatever its nationality, to have recourse to. But all chartered companies should be under the control of their respective governments. A separate chapter is devoted to the history of exploration in Africa, and it is pointed out how the British, Germans, French, Portuguese, and Italians have been instrumental in searching out the hidden parts of the continent, the British more especially, and in the regions south of the Equator more particularly ; how the great rivers have been traced out, not by following them up from their mouths, but by tracing them from their sources ; how the territories that lie along the main axis of the continent (roughly, south-west to north-east) are dominated by Britain, Germany, and Italy, and how the civilisation of Europe may be expected to advance along the same line. Another chapter sets forth the history of the partition of Africa among the chief nations of Europe, which has been accomplished by various treaties since 1885. Finally, it is urged that systematic plans should be pursued—plans suggested by the natural and obvious conditions and needs of the continent—by the European nations which have assumed the responsibility of civilising the Negro and his African contemporaries. Things should no longer be left to chance ; haphazard methods should be discarded, and if possible concerted action, based upon a common, systematic programme, should be taken by the Powers concerned. As things now stand, the northern half of the continent is on the whole Mohammedan, and is subject to Arab influence. (The Mediterranean seaboard was demonstrated early in the work not to belong, strictly speaking, politically to Africa.) The best fields for European enterprise are to be found therefore in the southern portion of the continent, inhabited by the Bantu peoples.

Mr. E. G. Ravenstein contributes a unique and most valuable series of fourteen maps, illustrating the physical and political geography of Africa and specially designed to accord with the treatment in the text. In an appendix at the end of the volume Mr. Ravenstein discusses the *data* upon which the maps have been constructed, a great deal of hitherto unpublished material having been utilised. The book is handsomely produced, and there is a full index.

The Industrial History of England. By H. de B. Gibbins, M.A., sometime Scholar of Wadham College, Oxford, and University (Cobden) Prizeman in Political Economy. With Maps. London : Methuen and Co. 1890. Pp. viii and 232.

This is the pioneer volume of a new series "on historical, literary, and economic subjects, suitable for extension students and home-reading circles." The series is to be edited by Professor Symes, Principal of University College, Nottingham. We cannot, speaking frankly, congratulate the editor on his choice of an author for the first book of the projected series. We have no fault to find with the subject : it is in all respects a commendable one, and one we ourselves desire to see studied throughout the country ; nor do we find fault with Mr. Gibbins' conception of the importance of this particular branch of politico-economic inquiry. Our quarrel is solely with the author's execution of his task ; and upon that ground we must

quarrel with him seriously. To begin with, he says (p. 118), "It is not the business of an historian to make charges against a class, but to put facts in their due perspective." Now Mr. Gibbins does not put facts in their due perspective, and he does, most decisively, make what are tantamount to charges against a class; consequently Mr. Gibbins, on his own showing, not ours, is no historian. How can we substantiate this grave charge? He speaks of the ancient kings and nobles of England in contemptuous phrases, gibing at their love of war, carping at "the follies and cruelties of that sordid age of so-called knightly chivalry, which has been idealised and gilded by romancers and history-mongers," taunting them with engaging in "foolish crusades," describing in disparaging terms historic events in which they took part, and then dealing in like manner with their economic successors, the owners of the soil. He introduces at a far too early stage the peculiarly modern conceptions of capitalist and working man (*e.g.* pp. 71, 72), and seldom speaks of the representatives of the former class without using some epithet that implies dispraise or condemnation. Yet he uses no such epithets when he comes to speak of the buccaneer seamen of Elizabeth's reign; because they, forsooth, were pioneers in the development of commerce, the glory of modern days in the eyes of those whose faith is pinned to industrial, that is, plutocratic, supremacy. Now this is not only a violation of the historic spirit: it is, as Mr. Gibbins knows well enough, bad economics: capitalists and working men belong to the last two centuries. The truth is, the author writes from the particular standpoint of the doctrinaire advocate of the working man. If he had simply done that, however, we should have had no grounds for finding fault with him; but he has allowed his predilections to bias him, to warp his historical judgment, and destroy much of his historical sympathy. But perhaps, after all, a good deal of the bias may only be due to careless writing, for on this score again Mr. Gibbins is a grievous offender. Let the following instances suffice to show the degree of his carelessness and his lack of precision—we cannot say in style—but in composition: "people met at *notoriously* convenient places" (p. 4); "held *a lot of* manors" (p. 12); "the villeins *had* certain rights which *had to be* recognised" (p. 13); "the *countries* of western Europe" (p. 48), when only one, France, can be meant; "provincial towns only held a market on one or two days of the *year*" (p. 60),—surely "week" is intended; "the *mighty* traders of the Hanse towns" (p. 63); "manufactures were transferred to *remote* villages . . . for the purposes of trade and profit throughout the kingdom" (p. 66); "among the effects of the Great Plague was the spirit of independence which *it* [the Great Plague] helped to raise in the breasts of the villeins and labourers" (p. 75); "oxen were still preferred to horses" (p. 110)—for what purpose? "the *shrewdness* of the queen . . . *forcsaw*" (p. 121); "the other *great old* sea-captains" (p. 121); "but at the very end of *her* reign *England* had" (p. 121); "the struggle *would have had to have been* fought" (p. 124); "English merchants did business . . . in the *Baltic* with *Holland*" (p. 124); "the French began by driving out English settlers . . . the English *retorted*" (p. 128); and so forth. This, however, is not all; the facts are in some cases manifestly erroneous, or only half stated, or put in a distorted way. A few instances may suffice by way of example. The social and economic tyranny which the merchant and craft guilds came to exercise over their members is not sufficiently dwelt upon. The sources from which the Edwards got the money for their wars are incorrectly stated; Mr. Gibbins even contradicts himself in the sentence "the Black Prince paid for his expenses in the French wars by the produce of *his* mines." Did not these kings extort large sums from the Jews and repudiate large debts which they owed to the Frescobaldi, Bardi, and other Italian banker-merchants? The connection between fairs as gatherings for religious observance and gatherings for trade is not alluded to. The author

forgets that herrings and wax counted amongst the chief products dealt in by the Hanseatic merchants. The spirit of independence which grew up among the people after the Great Plague had other causes, deeper seated and more widely spread, than that great calamity. Nor were Henry VIII.'s extravagances, and his ennobling of his courtiers, the sole causes that promoted the rise of a new nobility after the Wars of the Roses. The rise of Boston and Hull on the east coast in the sixteenth century (*cf.* p. 98) is an utterly misleading statement. Both ranked as early as John's reign amongst the first six ports of the kingdom, and the Hanseatic merchants established a steel-yard in the former town in 1259. Guicciardini is called Ludovico on p. 95, and Luigi on p. 102 ; this is, to say the least, confusing. Surat became the seat of an English agency, not in 1624, but in 1612. The London Company did not acquire possession of Virginia until 1609 ; in 1607 it was granted to Sir T. Gates' Company. Mr. Gibbins will find it hard to persuade connoisseurs of ceramic ware that "the Dutch had been the first artistic potters in Europe."

Yet, in spite of these adverse remarks, there is no reason why Mr. Gibbins should not do good work, when he learns to write with care and accuracy, to express himself less crudely, and to put bias away from him. This book shows he can do better ; his account of the manorial system is careful and clear, and the later chapters of his Period IV. are well written. The maps are a useful feature.

The Life of Ferdinand Magellan, and the First Circumnavigation of the Globe, 1480-1521. By F. H. H. Guillemard, M.A., M.D. London and Liverpool : George Philip and Son, 1890. (*Explorers Series.*) Maps and Illustrations. Pp. 353. *Price* 4*s.* 6*d.*

Not only is this the only complete life of Magellan in the English language, but it is also the only one in any other language, if we except that by Señ. Diego de Barros Arana, which, however, does not enter into any great detail. It is, therefore, doubly welcome.

The theme is certainly an inviting one to any geographer, and, in the hands of the accomplished author of *The Cruise of the Marchesa*, who thus has the undisputed honour of being Magellan's biographer, it has met with the most sympathetic and scholarly treatment.

The expedition which Magellan planned, equipped, and led forth on its voyage round the world returned home without its commander, who fell a victim to his own impetuosity, in the attack on Mactan, an islet in the Philippines. But the imperishable honour of discovering the Pacific, and the Western route through the strait that bears his name, and of having conceived and initiated the plan of circumnavigation is his. He was born in the golden age of discovery, and was the contemporary of the three great pioneer voyagers : Bartholomew Diaz, Vasco da Gama, and Columbus. It was natural that to a man of his spirit and determination, to whom the world was open, the romance of discovery should have appealed with irresistible force. And he accomplished his life-work with a singleness of purpose and a generosity of spirit that were rare in the troubled times in which he lived.

Dr. Guillemard traces with a master hand the various enterprises upon which Magellan entered—in India, Morocco, and, finally, his last voyage—and, by comparing their geographical value with those of his contemporaries, has given us a standard by which Magellan's services may be judged. What rank, then, does Magellan take as an explorer? "In the history of geographical discovery," says Dr. Guillemard (p. 258), "there are two great successes, and two only, so much do

they surpass all others—the discovery of America and the first circumnavigation of the globe. Columbus and Magellan are the only possible competitors for the supremacy. Were the vote of the majority taken, it would without a shadow of doubt be recorded in favour of the former." But Dr. Guillemard asserts, after discussing the point, "As an explorer, the merits of Magellan must be ranked as superior to those of the discoverer of the New World. . . . He carried out an expedition infinitely more lengthy and difficult in the face of incomparably greater hardships" (p. 259). Magellan's unsurpassed skill as a navigator is no less insisted upon by his biographer.

The care which Dr. Guillemard has taken to ransack the old Spanish documents bearing on his subject, the labour which such an arduous undertaking must have involved—scattered as these documents are—no less than the erudition that is displayed on every page of his work, evince a capacity for mastering detail and a conscientious spirit that are more commonly displayed in German than in English publications of the kind. No less commendable are the excellent series of maps that accompany and illustrate the text. The publishers of the *Explorers Series* have in this respect raised the standard of English book-production that others would do well to aim at. We find no less than eleven coloured maps, seven of which illustrate the progress of discovery in the New World. There are, moreover, five small maps in the text and seventeen illustrations.

We heartily recommend this volume to all readers. In many respects it is the best, since it is the most unique, of the *Explorers Series*.

The Ewe-Speaking Peoples of the Slave Coast of West Africa; Their Religion, Manners, Customs, Laws, Languages, etc. By A. B. Ellis, Major. Pp. 331. London: Chapman and Hall, 1890.

Major Ellis has already published a most interesting book upon the Tshi-speaking peoples of the Gold Coast, and the present volume is written upon the same lines. It is much to be wished that others who have a chance of investigating the habits and customs of savage or semi-civilised people would take the trouble to write in the same scientific spirit, for by so doing they would render far better service than by writing popular accounts of adventures and experiences which have been previously related hundreds of times. The author's original intention was to ascertain the various forms of religious beliefs which obtained among the Tshi-Ga-Ewe-Yoruba-speaking people of the Slave Coast, who, although having different dialects, speak languages belonging to one family, and have apparently sprung from one common stock. The date of separation into their present linguistic groups must have been rather remote, as the four languages are now so distinct that their construction and roots alone point to their common origin. The degree of civilisation reached by these four peoples is lowest among the Tshi, and highest amongst the Yorubas; the Ga and Ewe come in between. The volume before us, after a short introduction dealing with the extent of the country, the configuration of the land, and the climate, deals with the religious beliefs of the natives, their general tribal and local deities, their various superstitions, and their use of amulets and omens. We next find that the indwelling spirits and the souls of men, human sacrifices and the priesthood, are treated of, and then a brief but exceedingly well-written chapter follows, on the ceremonies attending birth, marriage, and death. The government of the country and the military system of Dahomé, with its laws and customs, are succinctly detailed, as is also an account of the language. The proverbs and folk-lore of the people are exceedingly interesting; and the volume concludes with a history of Dahomé from its traditional obscurity to the present day.

The Unknown Horn of Africa: An Exploration from Berbera to the Leopard River. By F. L. James, M.A., F.R.G.S. Map and Illustrations. Second Edition. London and Liverpool: George Philip & Son, 1890. Pp. 273. *Price* 7*s.* 6*d.*

This is the second edition, containing the narrative portion and the notes, of Mr. James's well-known volume of travel. To it is added an obituary notice of the author—who met his death last year on the West Coast of Africa—written by his brothers, Messrs. J. A. and W. D. James.

As we reviewed the volume on its first appearance (vol. iv. page 671), it is not now necessary to go back upon it. We cordially welcome this cheaper and popular edition because it brings within the reach of all the narrative of a famous and intrepid journey into a part of Africa that is still as good as unknown. The reprint in its present dress is all that could be desired, and many of the excellent illustrations have been reproduced.

A. M. Mackay. By his Sister. London: Hodder and Stoughton, 1890. Pp. 480. *Price* 7*s.* 6*d.*

Of the small band of pioneers sent out by the Church Missionary Society to Uganda in 1876 Mr. Mackay was the sole survivor at the time of his death in February 1890. For fourteen years he held loyally to his post, and, under circumstances of great peril and difficulty, did all that mortal man could do to perform the duties he had undertaken,—with what success the reader will learn from his sister's memoir, which, happily, is almost exclusively composed of extracts from the letters and papers sent home by Mr. Mackay himself. We know of no book that more clearly enunciates the danger to missionary enterprise in Africa of establishing at one and the same spot both Roman Catholic and Protestant stations. If it brought home to Europe this fact alone it would serve a good purpose. The missionary enterprise in Uganda is, moreover, a striking illustration of the interaction between Christian and Pagan influences in Africa. Mr. Mackay held very decided views on the problems before Europe in Africa, and we are bound to confess that his views are based on common sense, and are explained with remarkable ability and fervour. He himself was a type of the very best African missionary, for not only was he an ardent evangelist, but he was also so well skilled in mechanics and other useful branches of knowledge that he was able to teach the Waganda many useful arts. So much has recently appeared in the newspapers in regard to Mr. Mackay's splendid services in the cause of Africa that we have nothing left to add. We cordially recommend this volume to all readers. It is deeply interesting in itself, and a valuable contribution to African literature.

Light in Africa. By the Rev. James Macdonald. London: Hodder and Stoughton, 1890. *Price* 6*s.*

This is a volume of reminiscences. Mr. Macdonald spent twelve years in the mission-field of South Africa, and some of the experiences which he records should be interesting to his readers. He lived in troubled times.

The parts of South Africa which the author describes are, however, well known, and his book will scarcely throw more light upon them. Too often he falls into the very common mistake of attributing to the whole of Africa what is applicable to a very small part of it. Thus, the chapter on "The Native Africans—Manners and Customs" deals only with a few tribes in SE. Africa. Mr. Macdonald frankly owns that he is "not acquainted with any books which deals exhaustively with native customs and habits" (p. 148), and he therefore confines himself to original

speculation. The greater part of the book is, however, taken up by the record of his personal experiences, and, as such, should be welcome to those interested in African missions.

Home Life on an Ostrich Farm. By Annie Martin. London : George Philip and Son, 1890. Pp. 288. Illustrated. *Price 7s. 6d.*

A charmingly written volume on an interesting and novel subject. The authoress and her husband went out to Cape Colony in 1881, and purchased a farm in the Karoo district near Port-Elizabeth, for the purpose of rearing ostriches. She gives full details of ostrich-farming, as well as of Karoo beasts, birds, and reptiles. Her botanical knowledge is extensive and the illustrations accompanying the volume, especially of ostriches from photographs, are admirably executed. Not only is this a most fascinating and entertaining description of life in the Karoo, but it is also highly suggestive of other extensive regions in South Africa, where the life of the British settler is subject to similar vicissitudes and is rewarded with equal advantages.

Handbook of Field and General Ornithology. A Manual of the Structure and Classification of Birds, with Instructions for Collecting and Preserving Specimens. By Professor Elliott Coues, M.A., M.D., etc. London : Macmillan and Co., 1890. *Price 10s.*

This book consists of two parts. Part I. contains instructions for collecting and preserving specimens, and may be called field ornithology. Full and precise information is given as to the best methods for skinning and preserving birds, and useful hints about their habits, and suggestions and directions for field-work. Part II. gives the principles and practice of classification, with definitions and descriptions of the exterior parts of birds, and some account of their anatomy. We have rarely met a book where practical taxidermy is so fully explained and such care exercised to give the reader a clear idea of the subject. We know of no better handbook for students of ornithology.

"Men of Action"—Sir Charles Napier. By Sir William F. Butler. London : Macmillan and Co., 1890. *Price 2s. 6d.*

In Sir Charles Napier the author has a splendid theme for his able pen. Born with the bluest of blood in his veins, no general of his time so identified himself with the rank and file of the army. Guibert, the French drummer boy, and Pat Hennessy, full private in the 50th, who saved his life at Corunna, and bugler Delany and private O'Neil of the 22d, shared his admiration and praise with Sir John Moore in the Peninsula, and the colonels of regiments at Meanee.

Napier's letters to his mother show a tenderness hardly to be expected from one whose delight was to seek the forefront of the fight ; it is interesting also to think of him, in the midst of his busy life in governing Sind, finding time to send whole sheets of arithmetical problems to his young daughters, left in charge of a governess at Poonah.

The pleasantest memories of his life were, we are told, of the years spent as Military Resident in Cephalonia, where, as he used to say, all his schemes of administration, which he put into practice in Sind, were thought out.

Sir William Butler, in his admiration of Napier, glosses over many of his failings. With his undaunted courage and chivalrous bearing towards his inferiors, Napier was throughout his whole life in constant hot water with his superiors ; he could brook no opposition, and latterly his temper showed a brittleness that ended

in his resignation of the chief military command in India. Even his generalship might be called in question. His march of 120 miles across the Sind desert, in command of 400 men, leaving his main body on the Indus, while the Biloochee clansmen were mustering in thousands lower down the river, was a masterly performance, but his own place was with the main body. Military critics might also find fault with his placing himself in front of the line at the battle of Meanee, and being once or twice in the press of the fight, where the enemy stood at bay, numbering fifteen to one of the British force ; but, as an excuse, Sir William Butler tells us "the men behind him saw in this figure of their chief something that hid from sight the whole host of Biloochee foemen." The fighting at Corunna and Meanee is told in the author's graphic style.

The book contains several errors that should be corrected in the event of another edition being required. Imamgurh is spelt Emanghur ; Sewan is spelt Schwan ; there were three native infantry regiments at Meanee, not four ; and the Sutlej campaign, or first Sikh War, was a year earlier than the date give on page 167.

North-Eastern France, pp. 518. *South-Eastern France*, pp. 598. *South-Western France*, pp. 664. With Maps and 500 Illustrations. By Augustus J. C. Hare, Author of *Paris ; Walks in Rome*, etc. London : George Allen. 1890. *Price* 10*s.* 6*d. each Volume.*

A guidebook in four volumes, making in all some 2300 pages, is, to use the slang of trade, "rather a large order." Yet that is how the accomplished author of *Walks in Rome* proposes to deal with France. The three volumes already published extend to 1780 pages ; and a fourth volume, on North-Western France, is in preparation. There is scope here for a thorough and exhaustive treatment of the subject, and there can be no doubt of the minute care and thorough knowledge with which the work is done. The descriptions are full and serviceable, and are written specially with a view to the needs of English travellers. The chapters abound with interesting historical and antiquarian details. Much attention is given to description of buildings, and more especially of churches ; and these descriptions are illustrated with admirable wood-cuts. These are likely to be *the* guidebooks for France, in the estimation of English travellers. Each volume is an independent work with a separate index, so that no one need burden himself with unnecessary guidance. The maps scarcely reach to the high level of the letterpress. They are bald and weak. Nor do they always correspond with the text. One of Mr. Hare's strong points is that he uses only French names. We find "Lyon" in the book, but "Lyons" in the map. After this, we were curious to see how "Agincourt" and "Crecy" were treated. They are spelled in the text as we have spelled them, but they are not in the map at all. It may be added that these books differ from most guidebooks in being printed in bold, clear type, which it is a pleasure to read.

Blackie's Geographical Manuals. London : Blackie and Sons, Limited, 1890 :—

No. 2. The British Empire, Part I. The Home Countries : England, Wales, Scotland, and Ireland, pp. 224. *Price* 2*s.*

No. 3. The British Empire, Part II. The Colonies and Dependencies, pp. 224. *Price* 2*s.* By W. G. Baker, M.A.

These books are an attempt to apply to the requirements of Secondary Schools the method of teaching geography now common in Primary Schools, both in England and in Scotland. Each book is at once a text-book of geography and a geographical

reader. The stiff pages of fact and figure are relieved every now and then by interesting descriptive passages quoted from books of travel or from magazine articles. The matter is presented in an attractive way, and is generally accurate, though we were not aware that *Balmoral* was one of the "chief towns" on the Dee. We are also sorry to find Mr. Barker writing, "the Cumbrian group *are* a beautiful cluster," and "a line of chalk hills *extend* from Salisbury Plain." The illustrations are good. The coloured maps are also excellent; but not so the block maps, which are over-crowded and lack clearness from the want of distinction between land and sea. In the copy under notice the two parts are bound together. They are also sold separately.

Macmillan's Geographical Series: An Elementary Geography of India, Burma, and Ceylon. By HENRY F. BLANFORD, F.R.S., Late Meteorological Reporter to the Government of India. London: Macmillan and Co., 1890.

This book can be called an "Elementary Geography" only by comparison with such exhaustive works as Dr. George Smith's *Student's Geography of British India*, and Sir W. W. Hunter's *Indian Empire*. It contains as much information on the subject of which it treats as most students are likely to require. It is truly "elementary," however, in the sense of dealing with the elements or first principles of the subject. The general plan of Dr. Geikie's "British Isles" is followed, with modifications rendered necessary by the extent and unfamiliarity of the country, and the diversity of its characteristics. Residence and travel in India have qualified the author for his task. He has also the power of making his subject interesting by presenting it in a thoughtful and suggestive manner. The illustrations, most of which are from photographs in the Government collection, are really valuable aids to the text, besides being well engraved. The authorised lists of the Government have been followed in the spelling of names; but the names of well-known places that have acquired a fixed English spelling are in the usual form, as Calcutta, Delhi, Lucknow. There is no index; every book of this kind ought to have one.

Macmillan's Geographical Series: Geography of Europe. By JAMES SIME, M.A. London: Macmillan and Co., 1890.

This is another volume in the series of geographical books edited by Dr. Archibald Geikie, and it resembles the others in its admirable method and its high aim. One of its most valuable features is a careful summary of the history of each country, with special reference to successive races and forms of government. The chapter on the British Isles is almost wholly historical, as they form the subject of a separate volume in the series. The illustrations, which are specially prepared, are admirable. There are no maps.

Notice Historique sur les Divers Modes de Transport par Mer. Par G. TROGNEUX, Ingénieur des Constructions Navales, Professeur à l'École d'Application du Génie Maritime. Illustrations de H. Derenaucourt. Paris: Typographie de E. Plon, Nourrit et Cie., 1889. Pp. viii + 238.

The scope of the book is indicated in the title, and all who are interested in those who "go down to the sea in ships" will read its pages with pleasure, and, with perhaps greater pleasure, will examine the numerous useful and well executed illustrations with which they are adorned. There are specimens of vessels of all nations and of all ages of the world's history, in so far as man has record of them, from the rock-traced vessels of the men of the bronze age in Scandinavia to the

newest type of modern steel-armoured battle-ship and ocean-liner. The author, although an expert in naval construction, has written for the general reader, and has faithfully kept his aim in view, eschewing all dry and technical details of naval architecture. The cuts are, on the whole, very spirited and clear both in outline and detail. There is both an index and an analytical table of contents.

Pearson's General Tide Tables and Nautical Almanac. Hartlepool: G. Pearson. Pp. 206. *Price* 1*s.*

This publication contains a large amount of useful matter, well arranged and printed, and, so far as we have been able to test the various tables, etc., quite accurate. There are monthly astronomical tables of considerable value, and the tide tables are sufficiently detailed to make their use easy. The lists of buoys and lighthouses, also, are full and accurate, and the quantity of miscellaneous matter likely to prove of utility to shipmasters is considerable. The maps are small but clear and tastefully coloured. The volume, although only in paper covers, is fitted into a serviceable leather case, and is, altogether, an exceedingly useful, reliable guide to all the varied needs and necessities of those concerned in shipping, of which it professes to treat.

NEW MAPS.

EUROPE.

ENGLAND AND WALES, Excelsior Map of ——. By G. W. Bacon.
London: G. W. Bacon and Co.

LONDON, The District Railway Map of ——. *Price* 1*s.*
London: W. J. Adams and Sons, Bradshaw's Guide Office.

MOLVENO SEE'S, Tiefenkarte des ——. Von Josef Damian. Massstab, 1 : 25,000. Nebenkarte: Die Umgegend des Molveno See's. Massstab, 1 : 150,000.
Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 19.
Gotha: Justus Perthes.

ROMSDALSFJORD, Strandlinien und Terrassen im ——. Mit Zugrundelegung norwegischer Seekarten, hauptsächlich "Havbankerne fra Stat til Smolen und der Kart over Romsdals Amt" nach eigenen Untersuchungen gezeichnet von Dr. Christian Sandler. Massstab, 1 : 200,000.
Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 16.
Gotha: Justus Perthes.

RUEGEN, Die Insel ——. Massstab, 1 : 200,000.
Deutsche Rundschau für Geographie und Statistik, Jahrgang XII., *Heft* 12.
Wien: A. Hartleben's Verlag.

WESTERN EUROPE, Excelsior Test Map of ——. By G. W. Bacon.
London: G. W. Bacon and Co.

ASIA.

ASIEN zum Vergleich in flächentreuer unecht konischer Projektion mit längentreuen Parallelkreisen (Merkator Bonne) und in flächentreuer Azimutprojektion (Lambert) auf den Horizont eines Punktes von 40° N.Br. Massstab, 1 : 40,000,000. Entworfen von Dr. Alois Bludau.
Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1890, *Tafel* 4.
Berlin: Dietrich Reimer.

ASIA MINOR, District of Olba, Part of Celicia Tracheia ——. Explored by Mr. J. Theodore Bent. Scale, 1 : 348,480.

Proceedings of the Royal Geographical Society, August 1890.

ASIA MINOR, Griechisches Sprachgebiet im Pontischen Küstengebirge zusammengestelt von H. Kiepert, nach einheimischen statistischen Nachrichten auf Grund handschriftlicher Routenaufnahmen (vorzüglich des Dir. Krause). Massstab, 1 : 660,000.

Zeitschrift der Gesellschaft für Erdkunde zu Berlin 1890, *Tafel* 5. *Berlin: Dietrich Reimer.*

CYPERN, Dr. E. Oberhummer's Routen auf ——. Massstab, 1 : 800,000.

Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1890, *Tafel* 3.

INDIA, Atlas of ——. Quarter sheets: No. 16, NW., SW.; No. 22, NW.; No. 28, SE., SW. (with additions down to 1888); No. 47, SE. Full sheet: No. 54 (with additions down to 1889), 1 inch to 4 miles. 1 : 253,440.

INDIA, Railway Map of ——. Corrected up to January 1890. Scale 1 : 2,027,520, or 32 miles to 1 inch. *Published under the direction of Colonel Thuillier, R.E., Surveyor-General of India.*

BURMA, Map of ——, and adjacent Countries. Scale, 1 : 2,027,520, or 32 miles to 1 inch. 2 sheets. *Published under the direction of Col. H. R. Thuillier, R.E., Surveyor-General of India.*

LAOS, Carte de la Mission d'Exploration et d'Etudes de J. Taupin au ——, 1887-88. *Bulletin de la Société de Géographie Commerciale de Paris. Tome* XII., 1889-90, *No.* 4.

CENTRAL PERSIA, Lieut. Vaughan's Route through ——. Scale, 1 : 3,041,280.

Proceedings of the Royal Geographical Society, October 1890.

SOUTH-WESTERN PERSIA, Across Luristan to Ispahan. To illustrate the paper by Henry Blosse Lynch. Scale, 1 : 506,880.

Proceedings of the Royal Geographical Society, September 1890.

SOUTH-WESTERN PERSIA, The Karun River and Branches. Compiled from the Charts of Colonel Chesney, Lieut. Selby, and Captain Clements, by permission of the E. and T. S. N. Co. Scale, 1 : 506,880.

Proceedings of the Royal Geographical Society, September 1890.

UMATRA, Karte der unabhängigen Battak Lande, auf Grundlage der holländisch-indischen Karte nach Skizzen und Peilungen der Herrn Meissner, von Mechel und Freiherrn von Brenner. Massstab, 1 : 200,000.

Mitteilungen der K. K. Geographischen Gesellschaft zu Wien, Jahrgang 1890, *Tafel* 18.

USSURI REGION, Map of the South ——. Traced from the Map compiled in 1883 by the Cartographical Establishment of the Military Topographical Department of the Russian General Staff. Scale, 1 : 630,000. By J. B. Nadarov. Translated by Lieut.-Col. J. C. Dalton.

From the Proceedings of the Russian Imperial Geographical Society, vol. XXV., 1889, *No.* 3.

AFRICA.

AFRICA, Political Map of ——. By J. G. Bartholomew. *Price* 1*s.*

John Bartholomew and Co., The Edinburgh Geographical Institute, Park Road, Edinburgh.

AFRICA, A Map of ——, showing the Boundaries settled by International Treaties and Agreements. Scale, 1 : 20,000,000.

Proceedings of the Royal Geographical Society, November 1890.

AFRICA, Die Interessensphären in Südwest- und Ost-Africa nach den Verhandlungen zwischen der deutschen und englischen Regierungen im Juni 1890. Massstab, 1 : 10,000,000. *Petermann's Geographische Mitteilungen, Jahrgang* 1890, *Tafel* 14. *Gotha: Justus Perthes.*

ALGERIENS, Das Atlasgebirge ——. Gezeichnet von Dr. A. Rothpletz. Massstab, 1 : 5,000,000. *Petermann's Geographische Mitteil., Jahrgang* 1890, *Tafel* 15. *Gotha: Justus Perthes.*

CAMEROONS, Vorläufige Uebersicht von Dr. Zintgraffs Reise von Kamerun nach dem Benuë. Massstab, 1 : 3,500,000.
Verhandlungen der Gesellschaft für Erdkunde zu Berlin, 1890, *Band* XVII. *No.* 485. *Berlin: Dietrich Reimer.*

CAMEROONS, Wege Skizze der von Pr. Lieut. Morgen ausgeführten Reise im Hinterlande von Kamerun. Vom 5 Nov. 1889—13 Januar 1890. Massstab, 1 : 770,000. *Mitteil. von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Jahr.* 1890, *Tafel* 6. *Berlin; A. Ascher and Co.*

CAMEROONS, Der Weg von der Jaunde Station bis Ngila (Hinterland von Kamerun). Aufgenommen von Lieut. Tappenbeck. Mai 1889. Massstab, 1 : 150,000. *Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Jahr.* 1890, *Tafel* 5. *Berlin: A. Ascher and Co.*

CONGO, Karte des Mittleren ——. Auf Grundlage der Original Skizzen der Oesterr. Kongo Expedition, aufgenommen von Dr. Oscar Baumann, mit Benutzung der vorhandenen Quellen, entworfen und gezeichnet von Paul Langhans. Massstab, 1 : 400,000. 3 Blatt.
Mitt. der K. K. Geographischen Gesellschaft zu Wien—Jahrgang 1890, *Tafel* 19.

DEUTSCH SÜD-WEST AFRICA, Reise von Dr. C. G. Büttner in ——. Massstab, 1 : 4,000,000. *Verhandlungen der Gesellschaft für Erdkunde zu Berlin*, 1890, *Band* XVII, *No.* 7. *Berlin: Dietrich Reimer.*

EAST AFRICA, Bergprofil Sammlung während Graf S. Telekis Afrika Expedition 1887-88. Aufgenommen von Linienschiffsleutnant L. Ritter von Höhnel. Als Manuscript gedrückt im K. K. Milit. Geogr. Institut in Wien. Mit Indexkarte, 1 : 1,370,000.

This splendid collection of panoramas is a reproduction of drawings made during the expedition of Count Teleki through the country east of the Victoria Nyanza. The travellers had here to deal with a great variety of orographical material, and the system they have adopted to keep the vertical relief of this interesting country in memory will greatly increase the value of their topographical survey. It is worthy of special praise, and should be adopted by all future travellers. The sketch map which accompanies the book is very neatly drawn on the scale 1 : 1,370,000, and serves as an index-sheet. Each section has a number which corresponds with the number in the book. The absence of native names is apparent, but the travellers have only noted those names which are undoubtedly correct. The panoramas are of great value to the cartographer and especially to the traveller.

HAUT NIGER ET GOLFE DE GUINÉE, Carte du ——, par les pays de Kong et le Mossi levée et dressée de 1887 à 1889. Par L. G. Binger, Capt. d'Inf^rie^. de Marine. Par ordre de M. Étienne, Sous-Secrétaire d'État des Colonies. Echelle de 1 : 1,000,000. 15·7 miles to 1 inch. *Service Géographique des Colonies.*

The preliminary map of Captain Binger's journey in the Western Súdan was published in the *Bulletin* of the Paris Geographical Society on the scale 1:2,500,000. The present enlarged edition was ordered by the Colonial Department, and the

great importance which that department attributed to Captain Binger's travels is justified by the large amount of geographical and topographical information given on the map. The political divisions are distinguished by different colours. A dark pink shows the area under the French protectorate, and a lighter pink indicates the states tributary to those countries already under French protection or situated within the French sphere of influence. Two insets on a larger scale are given. One contains the lagoons of Gr. Bassam and Assinie, while the other is a survey of the lower course of the Comoé or Akbas river by Captain Binger. The map is well executed, and is a good specimen of cartography.

MATABELE-LAND, Environs of Gubuluwayo, showing Kraals and Reefs. Scale, 1 : 482,536. *Proceedings of the Royal Geographical Society, November* 1890.

NJASSA UND TANGANIKA SEE, Karte des Deutsch-Englischen Grenzgebietes zwischen ——. Nach officiellen englischen Quellen und mit Benutzung der Karte: Stevenson Road Country von Dr. Kerr Cross. Massstab, 1 : 1,000,000. *Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Jahrgang* 1890, *Tafel* 12. *Berlin: A. Ascher and Co.*

NEW ATLASES.

THE ROYAL ATLAS AND GAZETTEER OF AUSTRALASIA. By J. G. Bartholomew, F.R.G.S. Edinburgh and London: T. Nelson and Sons, 1890. *Price* 12*s.*

Both in conception and execution this is an admirable and most serviceable Atlas and Gazetteer. The twenty-eight plates illustrate the leading features of the physical, commercial, and political geography of Australasia. The statistical and general information and the descriptive Gazetteer add greatly to their value as a medium of reference, and appear to have been carefully compiled.

PHYSICAL AND POLITICAL SCHOOL ATLAS. A Series of Eighty Maps, with General Index. By J. G. Bartholomew, F.R.S.E., F.R.G.S. London: Macmillan and Co., 1891. *Price* 7*s.* 6*d.*

For its size and scope, this Atlas should meet the requirements of schools. The selection of maps is a good one, due regard having been given to British interests. The maps are clearly printed, and are not overcrowded with names. It is satisfactory to notice that, in the General Index, latitudes and longitudes are given in every case. We can confidently recommend this Atlas for use in schools, its treatment of physical and political *data* in conjunction being greatly in its favour.

SCHWEIZ, Topographischer Atlas der ——, im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg. topogr. Bureau gemäss den Derektionen von Oberst Siegfried.

Lieferung xxxv. :—

No. 183, Sursee.	No. 243, Lachen.	No. 369, Hohmatt.
,, 185, Buttisholz.	,, 245, Einsiedeln.	,, 371, Trub.
,, 238, Schwendi.	,, 324, Estavayer.	,, 402, Vättis.
,, 240, Säntis.	,, 326, Lully.	,, 455 Châtel St. Denis.

Lieferung xxxvi. :—

No. 182, Altishofen.	No. 304, Echallens.	No. 341, Chatonnaye.
,, 184, Willisau.	,, 306, Cheseaux.	,, 342, Lucens.
,, 198, Hergiswyl.	,, 311, Villars.	,, 440, Cully.
,, 258, Sattel.	,, 325, St. Aubin.	,, 454, Oron.

MAP FOR EXAMINATION

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

A JOURNEY TO TASHKENT.

(*Read at Meeting of Society, Edinburgh, December* 12, 1890.)

By Captain A. C. Yate,

Bombay Staff Corps.

(*With a Map.*)

It is not necessary here to enlarge upon the difficulty of obtaining permission to visit Russian Central Asia. All the latest visitors to, and writers on, that country dwell upon it. Not a few Englishmen have been turned back. When I came from India to Europe in June, the last thing I expected to do was to go to Tashkent. However, at the end of July last, I saw in the columns of the *Morning Post* and the *Indépendance Belge* that an excursion to Tashkent was to be organised at Paris by the Wagons-Lits Company. Even then I looked upon my being allowed to go as very problematical. However, I consulted Colonel Mark Bell, V.C. (whom every one knows as the foremost of military travellers in Asia at the present time), and Colonel the Honourable Reginald Talbot, Military Attaché at Paris, who went as far as Samarkand in 1888. Acting on their advice, I communicated with the Wagons-Lits Company, and, after a month of writing and telegraphing, I at last, at Odessa on 6th September, received from St. Petersburg, by telegram, the required permission to enter Transcaspia. Political reasons, with which every one is well acquainted, have for the present effaced the memories of 1812 and 1854-56, and united France and Russia; so the French now rather monopolise the privilege of touring in Russian Central Asia. Almost all of them come back and write books. With them no praise is too high, no admiration too great, for Russia's mission as an Asiatic civiliser. As an antidote to this, it is advisable to read the book written in 1876 by Eugène Schuyler, the Secretary to the United States Legation in St. Petersburg. Mr. George Curzon, too, has some appropriate remarks in his recent work on Central Asia (pp. 7-8), on the characteristics

of French Central Asian literature. The last two years have produced three books on Russian Central Asia by Englishmen—viz., by Colonel Le Mesurier, R.E., the Honourable George Curzon, M.P., and Mr. Dobson, the St. Petersburg correspondent of *The Times*. With such books to consult, we need hardly turn to French writers. Of late years few names have been more prominent in this field of literature than that of Mr. Charles Marvin, whose death in London was announced to us on Friday last. His intimate knowledge of the Russian language and people gave him advantages that other writers, though having a sounder appreciation of the real state of affairs in Central Asia, did not possess. It is not for me here to give any sketch of Central Asian literature. I can only refer my hearers to Mr. Curzon, who gives a list of books on the subject that fills twenty-seven pages, and adds that it might have been enlarged tenfold. We should be cautious about adding to a bulk so vast.

The honour of organising the first personally-conducted tour to Central Asia has fallen to a French company. Messrs. Cook and Gaze may have had all the will to undertake it; but that part of the world is at present not open to English enterprise of any kind. I have always understood that I have had to thank the friendly relations existing between General Annenkoff, the director of the Transcaspian Railway, and the chief of the International Sleeping Car Company for the pleasant trip to Tashkent that I made this autumn. I have certainly to thank the former for unvarying kindness and courtesy from the day that I landed at the port of Uzunada (the western terminus of the Transcaspian Railway) to the day that I re-embarked there. This was the second excursion along the Transcaspian Railway organised by the Wagons-Lits Company, the first being in 1888. I may mention that another one will probably be arranged for next autumn, and, if so, that the starting-point will be Tiflis or Baku, and not Paris. This will be a great improvement. Any one can go from Paris to Baku and back. The difficulty is to get farther. We Englishmen certainly ought to avail ourselves of these Wagons-Lits Company's excursions; and yet this year our party consisted of only three English and two French people. A man has only to send in his application to go and a cheque for the cost of the trip, and the company does the rest. I paid £84 from Tiflis to Tashkent and back, everything included, except wine and washing. For that sum I have seen the first Exhibition ever held, I believe, in Asia. Considering the size, population, commerce, manufactures, and revenue of our Indian Empire, I do not think that we should have allowed Russian Turkistan to set India an example in the matter of Exhibitions. However, we have done so. India has a population of 250,000,000, according to the census of 1881. The census of 1891 will probably show a population of 270,000,000. The revenue of India is about £70,000,000. Against this Russian Turkistan, Transcaspia, and the subject states of Khiva and Bokhara can show a population of from five to six millions only. As for the revenue, we know that there is a heavy annual deficit, probably amounting to half-a-million; and yet money is forthcoming for an Exhibition. It is one of the curious features of Russian administration that, while money is not forthcoming for ordinary wants, such as roads and

railways in European Russia, improved prisons in Siberia, roads in Central Asia, etc., the Tsar's Government always have funds for extraordinary needs, such as the Siberian Railway, the construction of which —if report be true—has not only been sanctioned but also commenced.

There is no longer much romance about travel in Transcaspia and Turkistan. When, in 1863, Vambéry made the tour of Khiva, Bokhara, Samarkand, and Herat, in the garb of a dervish, and when O'Donovan penetrated, in 1881, among the Tekes of Merv, there was romance and risk in that. Nowadays it is a simpler undertaking to visit the tomb of Tamerlane at Samarkand, and the scene of the tragic fate of Stoddart and Conolly at Bokhara, than it was less than a century ago to post from York to London. The Turkoman and Uzbek of to-day are more innocuous than the British highwayman of the last century. No part of the old coach-road from York to London is half so barren, bleak, and desolate as is the Galodnaya steppe between Samarkand and Tashkent. A pair of pistols was a *sine quâ non* for the former ; the latter may be now traversed without so much as a derringer. The Russians like to keep all this security for themselves and their *pro tem.* friends, the French. I did meet near Jizak an Austrian lady bound for Tashkent and thence (I heard) *viâ* Kuldja to China. She talked English excellently, and expressed great surprise at meeting an Englishman there. I did not think it necessary to remark that an Austrian was an equally *raru avis* in those climes. There are those who argue that because women can travel in a certain locality, therefore comfort and security are there. By no means. Women are as enduring and as adventurous as men. We may instance Lady Baker, Miss Bird, this Austrian lady whom I have just mentioned—who, alone with a courier, intended to reach (*viâ* Kuldja and China) the Pacific—Mrs. Littledale, Madame Dieulafoy, and others. One of the party with whom I journeyed from Baku to Samarkand in September last was a Frenchwoman. On my return from Tashkent I came across a Russian lady, who was sharing a *tarantass* from Tashkent to Samarkand with a Russian officer. The two were simply for the time being *compagnons de voyage*; but the lady took the lead. She bullied the driver, hectored the post-house master, and never allowed her companion to interfere. She had a masterful energy, and a freedom of speech and of manner, of which many men might have been proud.

I found some difficulty, on the 17th September last, in getting on board the steamer of the Mercury and Caucasus Company at Baku, bound for Uzunada. The Russian Minister of Finance, M. Vyshnegradsky, was a passenger. The only gangway to the first-class cabin was covered with a carpet in honour of his High Excellency, and that carpet was not to be profaned with the dirt off humbler boots. It was intimated to me that I might get on board by the backstairs. After a moment's reflection, I decided that I would not go on board by the backstairs, so I took that carpet by storm. M. Vyshnegradsky having been conducted and received on board with that ceremony which is the due of eminent men—and there is no doubt that he is an eminent man and an able financier—we set sail at 7 P.M.

Nine years ago I remember Baku not half the size it is now, and

twenty years ago its site was almost a desert. The Yankee expression of having "struck ile" is a highly appropriate one. Oil truly lubricates the path to millionairism. Naphtha is utilised in many ways. Petroleum, paraffin, vaseline, lubricating oil and grease, benzine, pomade for the hair, are among its products. The distilled oil is absolutely tasteless, and is admittedly used in the fabrication of salad oils. There is no more reason why it should not be used in the fabrication of butter. It is a mere question of the proper flavouring of the absolutely tasteless grease; it would be quite as palatable as margarine. There are signs that the supply of Baku oil is decreasing. The crude naphtha is much dearer than it used to be. If naphtha fails, it will be a sad blow to the steamers of the Caspian, the Volga, the Aral, and the Oxus, and to the locomotives of the Caucasus and Transcaspia. Coal from Rostoff and Khokand must replace it. The Baku oil-wells are well known. Mr. Marvin, in *The Land of Eternal Fire*, tells us a good deal about them; and it is not a fortnight since that a very good paper on them appeared in *The Scotsman* from a manifestly American pen. The chief thing to note now is, that the town of Baku, with its 40,000 or 50,000 people, lives mainly by that oil. If this oil fails, Baku will dwindle away. It will, however, always be an important harbour and railway terminus.

The Caspian is uninteresting. Sand and bare rock are not attractive. The south shore from Astrabad to Astara, and the stretch from Darband to Petrovsk are bearable. The rest is ghastly. The summer heat is damp and apoplectic, and in the winter every harbour in the north is frozen up. The sinuous approach to Uzunada, after passing the Krasnovodsk lightship, is dreariness itself: bleak mountains on the left, and bare sand on the right. Uzunada itself wakes up the tourist a little. There are the busy wharves, the wooden houses and sheds and barracks, the water-works, the great piles of bales of cotton, cases, boxes, etc., awaiting shipment or transport to the interior; or perhaps a detachment of time-expired Russian or Cossack troops, being embarked to the sound of musical strains more excruciating than a grinding organ or a hurdy-gurdy—their regimental band playing them out. They ought to have been playing "Home, Sweet Home;" but I doubt they do not know that lovely air in Russia. I never heard a good military band in Russia, not even of the Guards. The massed bands at the *Zariya* (evening prayer) at Krasnoe-Selo played, however, very well indeed; there were at least one thousand bandsmen present.

General Annenkoff and every officer of the garrison met M. Vyshnegradsky, the Finance Minister, on the 18th September at Uzunada. When Finance Ministers are on tour and control the grant of millions for railway construction and extension, when important economical, political, strategical, commercial, and financial issues depend on their verdict and pleasure, directors of railways have to be attentive to them. It was therefore very kind of General Annenkoff to notice and think of us as he did, and to give us a carriage all to ourselves. We were six in all, and had a compartment each. This was convenient, as we found the Transcaspian very warm in September.

It was pleasant sitting about in shirt-sleeves, eating grapes and melons, and drinking hot tea and iced lemonade. We had a restaurant car attached to the train, and plenty of ice. We could have delicious pheasants at every meal, and very cheap. A pheasant costs a shilling or so in Transcaspia. We used to shoot pheasants by the score in 1884-85. Unfortunately our Government ceded most of the best coverts to Russia. It was thoughtless of them to do so. I am surprised that the Amir Abdurrahman should have allowed it. He can have no sporting instinct. Herat may be of no great moment; but to allow Russia to monopolise all the best pheasant-shooting is too bad. It is bad enough that the Russians in 1885 should have bounced and blustered us out of 15,000 or 20,000 square miles of arid sand and "chul"; but that they should have deprived us of some of the best pheasant-shooting in the world, not to mention tigers and innumerable bears, is inexcusable.

Most people know that Mikhailovsk was the western terminus of the Transcaspian Railway till Uzunada was unearthed (or rather unsanded) and its harbour dredged. Krasnovodsk has a good harbour; but to extend the railway there would have cost, say, half a million. £40,000,000 to £50,000,000 are, however, about to be sunk on a Siberian railway; and yet there is scarce one good metalled road in Russia, and scarce one good paved street in any city in Russia. However, the "heathen Chinee" has to be kept in order on the Amur, while the comforts and conveniences of the millions of European Russia can wait. From Uzunada to Mollakari is sandy—great rolling dunes of sand. It looks as if nothing could check that sand. I have seen the great sand-wave of the Registan, near Kandahar, at least 30 feet high, pressing on slowly and steadily eastward, and threatening in future centuries to engulf Kandahar; and I have seen the southern edge of the same between Nushki and the Helmund burying a tall row of willow-trees. I have seen, too, the work that sand is doing east and north-east of the Oxus, near Farab and Karakul; and I have read Sir Douglas Forsyth and Bellew on the shifting sands of Kashgaria. I believe there is no power can stop drifting and shifting sand. The little barriers of *saxaul* that I saw about Peski and Repetek (near Charjui) were as likely to check drifting sand as a silken thread is to stop a runaway locomotive. I should say that sand-sweeps, on the principle of the American snow-plough, would be useful on the Transcaspian Railway. It is just 900 miles from Uzunada to Samarkand, and the train traverses that distance in sixty hours, just fifteen miles an hour. After travelling on that line in a carriage that shakes one to pieces, it is indeed a treat to come back to old England and do fifty miles an hour in the Scotch express, with a motion so smooth that the sense of motion is almost wanting. I have little doubt that the refreshment car on the Transcaspian railway was a most admirable digester. Motion, they say, is necessary to digestion. I cannot say that that refreshment car was the poetry of motion, but there was plenty of it. The most obstinate morsel could not withstand its disintegrating power. The marvellous thing was that the whole car did not go to pieces. If the contents of a cupful of

tea or a dishful of soup were not rapidly swallowed, they transferred themselves automatically to the table-cloth and the floor. Still, though I mention these little inconveniences, I wish again to repeat that we were deeply indebted to General Annenkoff for the comfort with which we made the journey from Uzunada to Samarkand and back again.

There is no beauty of scenery near the Transcaspian Railway. Bleak mountains such as the Kuren and Kopet Dagh have at times a transient picturesqueness in the light of the rising and setting sun. The miles of sand-dunes, the miles of waterless waste, the miles of dark arid hill-ranges, may have some strange power of fascination over the mind, but not of attraction to the eye. One can realise that the railway has had to struggle with the obstinate, defiant sands, with now the absolute dearth of water, and now the untimely attack of violent floods. Mr. Dobson (*Russia's Railway Advance into Central Asia*, pp. 139-145) describes these last well. As Bami and Kizil Arvat are approached, the complete desolation is varied by the habitations of the Turkomans, mud forts and walls and houses, streams of water, patches of cultivation and pasture, clumps of trees, etc. There is a certain fascination in thinking that even ten years ago this was almost a *terra incognita*. But as Geok (or rather Denghil) Tepe is neared, the interest increases. The place where Skobeloff broke the power of the Akhal Tekes in 1881 must be interesting. I have read, and doubtless others have likewise, all that Mr. Curzon and Mr. Dobson and Colonel Le Mesurier have to say about it. When I saw the reality, I could only marvel that 35,000 Turkoman men, women, and children could exist there for a month in the face and under the fire of 8000 or 9000 Russians, commanded by one of the most impetuous and intrepid of Russia's generals. The walls average twelve to fifteen feet in height, and enclose a space measuring about 1600 by 800 yards (for exact and detailed measurements I may refer you to Mr. Curzon, p. 77, *note*). The whole of this enclosed space can be swept by artillery, and perhaps also by infantry (long-range) fire. Thus the Asiatics could only be safe just behind the walls. Indeed they took refuge in pits and holes dug in the ground. There is no ditch worth speaking of, and the flank defences are *nil*. Yet it held out four weeks. Now compare with this such a town as Herat or Kandahar. The walls of Herat dominate the plain by 100 feet. The mud, hardened like concrete, offers almost greater resistance to artillery projectiles than solid masonry. The Royal Artillery experiments made at Kandahar in 1880 and elsewhere should have taught our gunners this.

Askhabad is an absolutely uninteresting place. Its only importance consists in its being the headquarters of the Transcaspian Government, and that from it the carriage-road *viâ* Kushan to Mashhad, which is now completed, starts. M. Lessar informed me that in June last he drove along it in a carriage-and-pair. If the Russian Consul-General at Mashhad, M. Vlassoff, wants a change of air and scene, a drive to Kochan or Askhabad is easily managed. Given a good new bridge over the Hari-Rud near Kochan, and one might travel in a post-chaise from Askhabad to Herat. The mountain barrier between Askhabad and Kochan apparently precludes the chance of a railway taking this line. Railway

communication with Mashhad and towards Herat will be made, naturally, from Dushakh *viâ* Sarakhs to Pul-i-Khatun, and thence to Mashhad and Chihil-dukhtar. I think, however, that we may hope with fair reason that the task of reaching Herat by rail will be undertaken by the British Government and from India, and not by the Russian Government from Transcaspia. Leaving out other considerations, such a step is essential for the maintenance of our commercial interests in Afghanistan and Persia. One of the latest Russian proposals is to raise the duty on Indian tea imported into Central Asia, so as to make it more expensive than the caravan teas brought in through Kuldja and Kiakhta. This, of course, will check the importation. We, being all for free trade, take no notice of tariffs *à la* M'Kinley, whether they emanate from Russia or the United States. With a railway, however, to Herat, and another across Beluchistan and Sistan to Southern Persia, Turkish Arabia, and Asia Minor, we might restore or retain, as the case may be, our supremacy in the trade of Persia and Afghanistan.

Running from Askhabad towards Merv, one passes under the northern cliffs of that great and curious natural fortress, Kalat-i-Nadiri. One or two recent writers have rather tended to spread the idea that this place is strategically valuable. It is not so. Fortified and held as it is by Persians, it is not even strong, far less impregnable. An enterprising European foe would be inside it in no time. But it is not worth fortifying strongly. The stream that flows in at the Arghawan-Shah Gate does not irrigate more than 20 or 30 acres, and it is doubtful if the whole cultivated area in this amphitheatre, measuring about 25 by 6 miles, amounts to 100 acres. Except the Arghawan-Shah stream, which flows along a narrow ravine, and which issues by the Nafta Gate on to the Atak, there is very little water. The pasture for sheep and cattle is not very good or abundant. Kalat commands no important route, although, if held by a determined and bold enemy, it would be an excellent base for harrying the Transcaspian Railway and the communications between Askhabad and Merv. Perhaps its chief value is that its possessor can control to a great extent the water-supply of the Atak. This water-supply is all important to Transcaspia. As the home and abode of Nadir Shah, who emancipated Persia from Afghan domination, and subsequently overran parts of Afghanistan and Northern India as far as Delhi, this spot is dear to the pride of the Persians. The Shah guards it jealously. I spent three very pleasant days there in July 1885, as the guest of the commandant, a Persian nobleman with a fair knowledge of French. Nowadays strangers and foreigners are rigidly excluded. In 1885 I remember looking down from the top of the northern cliffs of Kalat-i-Nadiri, over Lutfabad, and Kakha, and Dushakh. I will not say that I looked on it with that interest with which Moses and Aaron gazed on the Promised Land. It was, however, impossible not to feel an attraction for that land of mystery, on which Shakespeare, Abbott, and Burnes, Wolf, Vambéry, and O'Donovan had after all shed but very little light—an attraction that was however warranted, not by such an unsightly expanse of barren steppe, but by its political and geographical interest. For I saw nothing more. Searching for oases on that expanse was like

looking for needles in trusses of hay. I rode from Gugumaz (the principal village and residence of the commandant of Kalat-i-Nadiri) to the northern scarp of this natural fortress, along narrow pathways overhanging steep slopes. My Persian companions were evidently accustomed to it. As I noted that my outer boot and stirrup were overhanging a quasi-precipice, I felt thankful that I had confidence in my pony. The roads from Mashhad to Kalat-i-Nadiri are the worst I ever traversed—and I have tried some fairly bad ones off and on.

From Dushakh the railway runs nearly NE. to Merv, Bairam Ali, Charjui, and the Oxus Bridge. Certainly a good deal of romance and interest attaches to the name of Merv, but when seen it is a disappointing place. Denghil-Tepe is much more interesting. At Merv there is the fort of Kaushid Khan. The area of the fort is probably about the same as that of Denghil-Tepe. One finds that its southern rampart does not exist, and that the other three are so indented and worn away as to be indefensible. Yet the Merv Turkomans in 1881 talked of putting this fort in a state of repair and resisting the Russians. I can quite understand that they abandoned as hopeless the idea of repairing those ramparts, although, if sound, they would be much more defensible than those of Denghil-Tepe. The bazaar, town, and barracks of Merv are miserable structures on the west bank of the Murghab. Kaushid Khan's Fort, enclosing the club, some official buildings, officials' houses, new barracks, the site of the bi-weekly bazaar or fair, and several groups of *kibitkas*, is on the east bank. It is curious to think of the magic import that attached eight or ten years ago to the word "Merv." The lustre of its mediæval prosperity, the romance of O'Donovan's visit to it in '81, and, more than anything else, the universal ignorance about it, had surrounded it with a halo of importance that was out of proportion to its actual value. Of course it and its neighbour, Bairam Ali, are not to be ignored. Under the administration of Russians, and thanks to works of irrigation, it is possible that the time may come when the Imperial domain at Bairam Ali and the Turkoman lands at Merv will again support a large population. The modern Merv is not on the site of the ancient town, but 18 miles SW. of it. The ancient Merv is close to Bairam Ali. In constructing the Maruchak and Sultan-bend dams, the Russians are merely reviving the irrigation system that has gone to rack and ruin since the Amir Maasum of Bokhara destroyed the city of Bairam Ali about one hundred years ago. The latest reports from Sir Colin Moncrieff and M. Cotard are of a nature to suggest that the Tsar may find his domain at Bairam Ali not so productive as he anticipated. If the dams are, however, a success, the whole of the banks of the Murghab, from Panjdeh to Merv, will be brought under cultivation, instead of being a desert relieved by one or two oases. Good roads will be made from Merv to Maruchak and Chihal-dukhtar, and the valleys of the Murghab, Kushk, and Kochan, and the steppes of Badghis will once more be studded with towns and cities. The remains of these towns are there. If they existed once, they may exist again. If we consider the history of the past twelve hundred years, the Mohammedan conquest, the invasions of Chengiz Khan, Tamerlane, and their successors, the continuous changes of dynasties in

Bokhara, Merv, Herat, and Persia, with all the tangled web of rivalries, feuds, and wars, followed by the lawless domination of the Turkomans during the present century, the desolation of Badghis is not surprising.

The Merv of to-day is no longer the abode of the Turkomans. The *aul* and *kibitka* have given place to the bazaars, barracks, and buildings of the Russians. The Turkomans reside in settlements round about, and come in to the bi-weekly fairs held in Kaushid Khan's Fort. Like the Uzbek, the Turkoman seldom condescends to walk. He has a horse to ride, if he can afford it; and if he cannot do that, he has a donkey. From 8 to 11 a.m. they crowd into the fair, bringing their wares. There is a place for everything. There are melons, grapes, and other fruits and vegetables; here are piles of the coats, boots, and sheepskin hats that the Turkomans affect; here again, carpets, saddlebags, Astrakan skins, webs of cloth made of cotton, and of goat or camel-hair. The best camel-hair cloth is very good and very expensive. The Turkoman carpets are famous for durability of colour and material. The Turkomans often make certain parts of their carpets of silk; but a year or two ago the Tekes presented an entire silk carpet to the Tsar.

If the scheme for irrigating Bairam Ali succeeds, that place will soon be greatly changed. Already large storehouses are springing up. A nursery, containing thousands of saplings, covers an area of a square mile or so. Probably, under the influences of a new civilisation, much of the remarkable remains now existing there will be effaced. These remains, whether they are the handiwork of Alexander, or of a race earlier than the date of his invasions, of Iranian or Turanian, of Zoroastrian or Mohammedan origin, whether they bear the name of Alexander, Sultan Sanjar, or Bairam Ali, are well worth seeing. Those who wish to see them would do well to take advantage of the next excursion that goes to Transcaspia. To visit the ruins properly entails a ride of fully 20 miles. We spent four hours hurriedly inspecting them, and could easily have spent four hours more. The bricks of the ruined city of Bairam Ali are now being used in the new buildings. What appears to be the ruin of greatest antiquity is a circular rampart, about half a mile in diameter, and in some places about 100 feet high above the level of the surrounding country. It encloses a citadel of almost equal height. Excavations were begun here, but discontinued—presumably from want of funds. Alexander is said to have founded a city here; but the Turkomans, who have only occupied this country for fifty years or so, know nothing about its site. More things in Asia are attributed to Alexander than that king and conqueror ever dreamt of. The great landmark of the district is the tomb of Sultan Sanjar, of the Seljuki dynasty, who ruled in the twelfth century A.D. It is second only in size to the mosque of Bibi Khanum, in Samarkand. The original tombstone has been destroyed, and is now replaced by a mud structure that is very unworthy of the edifice in which it stands. The other large ruins are thought to be ice-pits, water reservoirs, and pigeon-houses. I am in favour of the latter. I have seen huge pigeon-houses at Kumesheh, in Persia, and between Herat and Ghorian, that bear some resemblance to those of ancient Merv. It is well to view this great expanse of ruins from some

commanding point. What was once so populous is all a desert now. If it could be irrigated by races that we now look upon as uncivilised and unenlightened, are the leading English and French engineers to admit their inability to re-irrigate it? Yet such is the purport of paragraphs that are now appearing in the papers. We know that many of the engineering and architectural works of olden times are such as to excite wonder nowadays. We have our steam, pneumatic, hydraulic, and electric contrivances; and the ancients (we suppose) had none of these. That was the age of stone, and this is the age of iron and steel. We rear Forth Bridges and Eiffel Towers, and they reared Pyramids and Babylons. It is difficult, however, to believe that irrigation is a science that was more advanced 1000 years ago than it is now. There is one thing, however, to remember, and that is, that now the water is diverted to the Turkoman and Russian settlements at Yulatan and Kaushid Khan Kalah. This was probably not the case until within the last century. That the Tsar and the Government are in earnest about the re-population of Bairam Ali is certain. An imperial domain, an extensive nursery-garden, and substantial stone buildings are not established for nothing. In October last, about 100 families of Tunganis or Dungans (as they are variously styled) arrived from Kuldja, for employment at Bairam Ali. These Tunganis are Chinese Mohammedans, like the Panthays of Yunnan. Both alike rebelled against the Chinese Government, some twenty years ago; and both, at a later period, felt the mercilessness of Chinese revenge. Many of the Tunganis found refuge in Russia and of the Panthays in the Shan States and Burma.

In speaking of a trip to Tashkent, one can hardly ignore altogether the Transcaspian Railway, although it has already been well described by Major C. E. Yate, Colonel Le Mesurier, Mr. Curzon, Mr. Dobson, and by several other writers, English, French, and Russian. The length of the line, from Uzanada to Samarkand is 900 miles. It is built to admit of slow traffic only, like most of the lines in European Russia. It will be remembered that not long ago (I think in 1889) a serious accident occurred to the Tsar's special. It all came, I am told, of running too fast on a badly-made line. Similar mishaps would presumably occur on the Transcaspian line, if the trains ran too fast. As for the sands, I have already pointed out my reasons for thinking that drift-sand cannot be controlled. After a storm, the line has to be cleared of sand. I was assured that, in the ten years that have elapsed since the line was begun at Mikhailovsk, no serious sand-block has been known. The permanent way has in many places been edged and solidified with *saxaul* bushes, and with good results. It at least prevents the sand from being blown away and leaving the rails and sleepers all bare. I heard Russians talking of planting trees, and running canals or ditches parallel to the line, from Charjui towards Repetek and Peski (where the sand is worst); but I don't think such projects are practical. Anyhow, they are likely to cost more than they are worth. Near the Oxus, at Charjui, the wind sets pretty steadily from the NE. and NNE. You can tell this by the lay of the sand-drifts, which slope gradually on the north, and abruptly on the south side. For years past the sand has been invading the tract on the

right bank of the Oxus, form Farab to Karakul. It comes from the Kizil Kum. The sand-drifts extend as far as the eye can see on either side of the railway. It is a tract that is evidently doomed to desolation. In time it will be the counterpart of the tract on the left bank, from Charjui to Peski, which is nothing but an expanse of rolling sand-deserts, studded with *saxaul* and tamarisk. The average pace of the mail-train on the Transcaspian Railway is 15 miles an hour, including stoppages. It would not be advisable to go quicker, otherwise some of the cars might shake themselves off the line. The gauge is five feet. The ordinary gauge in Great Britain is 4′ 8½″. The regular trains on the line are three mails each way weekly, and a daily mixed train each way, between Uzanada and Samarkand. There are also goods trains as required. The fuel used in the locomotives is *astatki*—the refuse of the Baku naphtha, after the extraction by distillation of all its valuable properties. Special trains run for supplying the several stations with water, victuals, and *astatki*. Most of the stations have reservoirs for water and *astatki*. The railway buildings are mostly of good solid masonry. The Oxus bridge was finished early in 1888, and is still standing. It is entirely of wood; and trains have to cross it carefully at the rate of four miles an hour. It is two miles long; so the trains take half-an-hour to cross it. Undoubtedly General Annenkoff would gladly see this wooden structure replaced by an iron one; but the bed of the Oxus is so continually shifting, that to sink a large sum of money in an iron bridge that might be left high and dry in a year or two would be rash.

One of the pleasantest days that we spent in Transcaspia was spent with his Excellency General Annenkoff at Amudarya. When we arrived at the railway station early on the morning of the 5th of October we were met by an A.D.C., who told us that General Annenkoff expected us at his house at ten o'clock. The first place the General took us to was the schoolhouse. There were seventy boys and girls, some twenty of whom came every morning from Farab on the right (east) bank of the Oxus by train, returning in the evening. The general remarked to us: "When I start a cantonment anywhere for my railway troops, amongst the first things I construct are a school and a church." The appearance of the Amudarya school was very similar to that of our national schools. The children sang in chorus several Russian airs and hymns, and were catechised by the schoolmistress for the edification of his Excellency. From the schoolroom we went to the barracks, where we found all in apple-pie order and the soldiers standing at attention with a rigidity that Tommy Atkins might envy. On such occasions as these, Russian generals and soldiers always interchange a few stereotyped words of a complimentary nature. In the kitchen of one company we were invited to taste the soup for the soldiers' mid-day meal. It contained meat and potatoes, flour, salt, butter, onions, cabbage, etc., etc., and was excellent. The men of each company manage their own catering, electing one of their number as caterer. We then were taken to hear the band practise. After this we returned to the road. Bugles were sounded. In ten minutes the railway battalion had turned out and fallen in. Meantime a message was sent to the Turkistan battalion encamped about a mile away. This

battalion arrived on the pound in parade order in less than an hour. It was not forewarned. It proved to be a battalion that had distinguished itself at the capture of Tashkent in June 1865, and had participated in the ejection of the Afghans from Dash-Kepri on 30th March 1885. The latter feat confers no distinction. It was nothing for Russian infantry armed with Berdans to oust 800 or 900 Afghans armed with Brown Besses. It is true that the *Times* told the world that a handful of Russians had inflicted a crushing defeat on a vastly superior force of Afghans. But in point of facts our leading journal is as prone to err as others. As far as I can ascertain, the numbers of Russians and Afghans engaged were nearly equal. What General Komaroff *did* deserve credit for was that with thousands of Turkomans behind him ripe for rebellion, and at the risk of bringing on a war with Great Britain, he attacked and turned the Afghans out of Panjdeh. Nothing succeeds like success. Komaroff succeeded.

The country from the Oxus at Farab to Charjui is not very interesting. At Karakul red and white wines and cognac are made from the grapes of the country. Some Frenchmen are in charge of the place; but it is understood that General Annenkoff has a personal interest in it. We tasted the wines at his table; and very good they were. General Annenkoff is very keen about the development of Central Asia. He interests himself personally in horse-breeding (from thoroughbred English and Turkoman strains), in wine-growing, and in everything that can further trade, manufacture, and agriculture. He is anxious to throw open the railway and country to foreigners, so as to encourage trade and progress. His schemes for railway extension to Afghanistan are not such as can be or should be encouraged by us. It is currently reported that he will superintend the construction of the Siberian Railway. His antecedents qualify him for it. It stands to reason that the Transcaspian and Siberian Railways must be joined. Regarding the extension of the former, opinions differ. Tashkent being the capital of Turkistan, we would expect the railway to be continued direct from Samarkand to Tashkent. Good authorities, however, think that the first extension will be from Samarkand to Khokand. The importance of the Ferghana District, from a mineral, agricultural, and manufacturing point of view, may account for this. It has a population of 700,000. Semipalatinsk is likely to be the point where the Siberian and Transcaspian lines will meet.

A word or two about the prisons at Bokhara. Of course, I read the description of them by Dobson (pp. 255-7) in 1888. I can only say that, in October 1890, I saw nothing of the dirt, squalor, or ill-treatment that he describes. I found the prison clean and fairly comfortable. The prisoners were not chained together when we saw them, but the chains were there, and we were shown how the whole row of prisoners could be chained together. The prisoners were docile. We gave them bread and money. We asked one or two about their crimes, and, by their own admission, they were justly undergoing punishment. However, the chief point of interest about the Bokhara prison is the fact that in it (*i.e.* in a subterranean dungeon or pit now closed) poor Colonel Stoddart and Captain

Conolly were perhaps kept. Opinions differ as to whether they were kept in the citadel prison or in the prison I saw. I will state what M. Klem, the Secretary to the Russian Envoy at Bokhara, told me. He said that he had questioned an old Russian trader, who had come to Bokhara in or about 1842 (he died in 1889), and recollected that soon after his arrival two Englishmen were executed on the Righistan. This man stated that the two prisoners (whoever they were) were imprisoned outside, and not inside the citadel. They could only have been Stoddart and Conolly. M. Klem stated very positively that the place where Stoddart and Conolly were kept was in a dungeon under the domed prison that we visited. Mr. Dobson (p. 256) is also of this opinion. No stranger is allowed in the citadel nowadays, and it is not likely that Stoddart and Conolly went there. On the other hand, Khanikoff says the prison was inside the citadel.

During our stay in Bokhara we were the guests of M. Lessar, the Russian Envoy or Diplomatic Agent. We spent two days there, and saw everything. I consider Bokhara one of the unpleasantest and dirtiest cities I ever was in. The population are of the lowest order, and of contemptible physique and appearance. We saw no manufactures there that could touch what we saw at Merv, Samarkand, and Tashkent (both in the bazaars and the Exhibition). No stranger is allowed in the citadel, where live the Amir and Kushbegi. The streets are narrow, and the roads execrable. We drove to and from the railway station to the Residency in carriages. When we met a cart in a narrow lane, great manœuvres were needed to admit of passing. There are few more interesting men to talk to than M. Lessar. He first came to the front in 1882, when he travelled from Sarakhs across Badghis into the Herat valley at Ghorian, and reported that a railway could easily be made to Herat. He has since travelled a good deal in the most waterless tracts of Transcaspia. M. Lessar told us how, at Ghorian in 1882, the Afghans talked of taking him a prisoner to Herat before the Governor. To see the inside of Herat was the height of his ambition. However, the Afghans finally decided not to take him to Herat, and put him across the frontier into Persia, near Kochan. M. Lessar speaks English well, and takes in, among other papers, *The Times*, *Review of Reviews*, *Public Opinion*, and several English magazines.

The Bokhariot troops merit a paragraph to themselves. Every morning the infantry parade on an open space to the north of the city walls. On Saturdays the commander-in-chief attends, and then the artillery and cavalry parade as well as the infantry. At times the Emir himself looks on from a garden window hard by. He has none of the soldierly spirit of William II. of Germany. He leaves his army entirely to his commander-in-chief. The infantry drill that we saw was strictly original. I never saw anything like it. The uniforms were somewhat similar to the Russian. The guns were mostly percussion muskets. Bayonets remained always fixed, as with the Russians. Two or three battalions were drilling —some doing battalion, some company drill. One band played in the centre, and gave the time to the whole. Some of the non-commissioned officers carried wands only, no arms. Several of the officers were Afghans,

and they were among the few really soldierly-looking men of the lot. The men never ceased keeping time to the music. When halted, they always marked time with one leg. The movements in square and to resist cavalry were truly marvellous, and absolutely impossible, or useless, in the face of an enemy. At any cessation in the drill the men lay down here and there, and ate or smoked, the officers reclining on rugs in the shade. We spoke to one or two officers, and found them most civil. There was a great deal of inattention and staring about in the ranks; still the men drilled well. In fact, that is about all they are good for. They looked as if they had no pluck and no stamina.

Samarkand is a very different place from Bokhara, which is the *ne plus ultra* of squalor. The climate is exceedingly pleasant in autumn, though doubtless warm in the summer and cold in winter. Tashkent has a similar climate. The old town of Samarkand is small compared with Bokhara, but the bazaars and streets are more open and airy. There is nothing to buy except silk. We spent some time in a silk factory. The huge edifices of Samarkand, the tomb of Tamerlane, the mosque of Bibi Khanum, and the three *medresses* of the Righistan, are unequalled in Central Asia. I cannot agree with Mr. Curzon in speaking of the Righistan as the noblest public square in the world. I would rather look on the Louvres from the Tuileries gardens, or on that grand square in Vienna enclosed by the Palace, House of Parliament, Museum, and other splendid buildings. I have not a great admiration for the effect of the Oriental tile-work, at least in its ruined state. I must admit that some of the designs are very effective, and certainly nothing like them is produced nowadays. It is a defunct species of architectural ornament. Globe-trotters think nothing of pilfering an old tile, if they get the chance; the *mullas* in consequence watch all visitors closely. One Frenchman we met inveighed in strong terms against the Vandalism that prompted travellers to despoil the fine specimens of Mohammedan architecture. Nevertheless, when he left Samarkand to return to France, several tiles were found in his room. He had forgotten to carry his spoil with him. I was surprised to note that Russians and Frenchmen never removed their hats when they entered Mohammedan shrines and mosques. We Englishmen always did so. Mohammedans always remove their shoes when they enter one of their religious edifices. I felt that to remove one's hat was at least due to the memory of Taimur-lang, his sons and grandsons, and his ministers and *mullas*, all of whom lie buried in what is known as "Gur-Amir," or the Tomb of Taimur-lang.

To any Anglo-Indian who knew Afghanistan and Afghan politics well it was interesting to meet and talk to the Afghan refugees, with Surdar Mohammed Ishak Khan, the late Governor of Afghan Turkistan. As you will remember he rebelled against his cousin, the Amir Abdurrahman, two or three years ago, and, being defeated, fled into Russian territory with a large following. There he is still. One of his followers turned out to have spent a year with the Afghan Boundary Commission as a *mehmandar*—in other words, a victualling agent. He knew all the members of it well by name. I was interested to meet him, though I left the Commission before he joined it. The Russian cantonment at Samarkand

covers several square miles of ground. There is a well-wooded park, great broad roads lined with trees, and the houses are all buried and almost lost amid trees and gardens. There is a large fort on the top of a rising ground overlooking the native city, and separating it from the cantonment. The summer barracks are three or four miles away, near the railway station. The troops occupy them in summer only. They are constructed very simply and cheaply, and in marked contrast to the palaces we erect for our soldiers in India. For years past there has been a tendency to molly-coddle the private soldier (not the officers, mind you) in India. The medical men are mainly responsible for it. One of the many good works that Sir Frederick Roberts is now doing in India is taking the British soldier out of the cotton-wool in which others have been packing him up. I have over and over again read the remark that the Russian soldier is better fitted to bear the Asiatic climate than the British. But I do not believe that the Briton, who has proved his ability to advance and struggle in every part of the world, is to be beaten by any European in his power of enduring climatic vicissitudes. If, however, the British soldier is molly-coddled, and the Russian soldier is inured to hardship, the latter will prove the best man in time of trial. I and my companions were very much impressed by the healthy physique and manly, cheery, look of the Russian soldiers whom we saw in Transcaspia and Turkistan. They were real good stuff for soldiering. It is somewhat amusing to think of our soldiers, many of whom if they were in England now would be glad to avail themselves of General Booth's scheme for aiding the unemployed, reclining luxuriously under punkahs in a darkened room in India and having servants to wait upon them. I can assure you that the Russians in Asia have no such nonsense. There is another thing that one notices in Central Asia: within the twenty-five years that the country has belonged to Russia, all the inhabitants of the towns, and many of those in the country, have learned Russian. In India we pay our officers and officials to learn all sorts of outlandish dialects, which, in nine cases out of ten, they forget as fast as they can. Russia pays nothing, but makes the natives understand that the sooner they learn Russian the better for their interests. This is the right principle, for it tends to reduce the number of languages and dialects spoken in the world. What is the use of inventing Volapük, if the empire on which the sun never sets encourages the use of every barbarous language that is spoken in its dominions? They may be most attractive to ethnologists, philologists, and other scientists, but for a practical Government to pay a premium for their preservation is a mistake. It is well known that barbarous races die out as civilisation advances. Barbarous languages should do the same.

As the object of this paper is partly to encourage others to visit Bokhara, Samarkand, and Tashkent, I think a few words about hotels will be appropriate. At Bokhara, as I have mentioned, we were the guests of M. Lessar, and afterwards, thanks to General Annenkoff's courtesy, lived in our railway carriage. Samarkand is rich in hotels, but none of them can be styled first-class. Lifts, electric bells, electric lighting, and such like improvements, have not come in. I should say that the Central Asian hostelries answered more to what in Paris is

called an *hôtel garni*—a place where you can lodge but not board. However, in Samarkand, the difficulty was—not to find the wherewithal to refresh the inner man, but the wherewithal to cleanse the outer man. At Tashkent the hotel kept up two or three brass basins for the use of the nine or ten inmates. There was no washing apparatus in the rooms, there was no lavatory, there was not even a pump. If a man arrived at the conclusion that he had at least fairly earned a wash, he put his head out of the door (there were no bells), and shouted for the basin and water. Hip-baths are as yet unknown in Turkistan. In other respects the hotel was clean and the proprietors (*sarts*) obliging. I have had some experience of hotels, and I think that, all considered, the proprietor of the Hôtel de l'Europe at Samarkand should be awarded the palm for extortion. At St. Petersburg I have paid extortionate prices for good food and wine; at Samarkand we paid them for bad food and wine. In Turkistan every staple food is excessively cheap, and that is not the case in large European cities. Samarkand beer and wine are drinkable, but neither choice nor costly. Nevertheless our bill amounted to about 25s. per head per diem. It was pure extortion. When we saw this bill, we realised the advantage we had enjoyed at Tashkent in being able to use the military club. We got good wine and food there at most moderate prices. Such prices are, I imagine, indispensable to the incomes of all the junior Russian officers.

The most interesting part of our journey was certainly that from Samarkand to Tashkent and back. It has to be done in a *tarantass* with post-horses. A *tarantass* is a wooden vehicle with or without springs, on four wheels, in which two persons can recline side by side on straw, mattresses, rugs, or any other soft substance. I can assure you that a good deal of padding is required to enable any one to stand thirty to forty hours' jolting. Still, such a journey entails nothing more than some temporary discomfort. It is true that, of our party of five, three shirked the *tarantass* journey; but, on the other hand, Russian ladies frequently make long journeys in it. The 190 miles from Samarkand is nothing compared to the two or three weeks' journeys done in Siberia. As I have already stated, I met near Jizak an Austrian lady all alone, bound for China *viâ* Tashkent and Kuldja. For means of locomotion she would have to choose between a *tarantass*, a horse, or a camel. We have recently heard of Mr. and Mrs. Littledale reaching India across the Pamir and the Hindu Kush. I will not go so far as to say the journey in a *tarantass* from Samarkand to Tashkent is a pleasure. Dirt, dust, flies, heat by day, cold by night, joltings, bad food, etc., are not comforts. The dust at times was hanging so thick round the vehicle that we had great difficulty in breathing. I began to realise what a Central Asian dust-storm might be, when travellers are said to be absolutely suffocated. However, despite these little drawbacks, I hold that the game was worth the candle. The Tashkent Exhibition was very instructive, and it is the one thing that was new that previous travellers had not seen. What with the Finance Minister, M. Vyshnegradsky, the Inspector-General of Prisons, M. Galkin Vrassky, General

Annenkoff, M. Lessar, and their suites, all visiting Tashkent at once, not to mention private travellers, it was great luck that we got a carriage and horses at all. We have really to thank General Annenkoff for getting them both going and coming. As for the postal officials, for prevarication (not to use a stronger term) even Orientals would find it hard to be even with them. However, at 10 a.m. on the 22d September, we got our two *tarantasses* (one for ourselves and one for baggage) and horses, and off we went. At 9 p.m. we got to Jizak, and were told we could get no horses, as everything was retained for M. Vyshnegradsky. Again we had recourse to General Annenkoff at Samarkand. We wired to him and then went to sleep. At 1 a.m. on the 23d we were awakened and told that telegraphic orders had come and that we might go on. We thanked Annenkoff in our hearts. I can assure you that to have to spend two or three days at a postal station between Samarkand and Tashkent would be little better than imprisonment in jail. From Jizak to the Syr-darya, a distance of 80 miles, the road crosses the Galodnaya Steppe. In the old coaching days no part of England can have been so desolate as this is. And yet it is perfectly safe, safer than even a mail-coach route was from the Sheppards and Turpins of the last century. There is no water, no food, nothing on this steppe. The squalor and dirt of the postal stations is disgusting. The road is what the *tarantass* and cart wheels make. It is well named the Galodnaya (hungry or famished) Steppe. The Syr-darya is crossed by a swinging bridge, a very fine one. From there onward to Tashkent, a distance of 45 to 50 miles, a road is made in a sort of way. As the Finance Minister was coming, it was being improved a little and watered, *i.e.* flooded. We benefited by this so far that we escaped some dust, but were liberally bespattered with mud. A little dirt more or less does not matter when you have been for thirty hours in a *tarantass* on a Central Asian road. We were very thankful when, at 10 p.m. on the 23d September, after a thirty hours' drive, we descended at the Moscow Hotel in Tashkent. We immediately requisitioned all the brass basins to be found in the hotel, and surprised the proprietors by the quantity of water we required for our ablutions.

We spent three very pleasant days in Tashkent. The first morning, we drove all round the native town and bazaars; and on the two others, along the Orenburg and Khokand roads. A strong fort here, as at Samarkand, dominates the native town. The Russian troops were located in barracks in various parts of the cantonments. There are fine broad roads, lined with trees and water-courses. Some of the shops are very good. The afternoon of each day we spent at the Exhibition. Last year I visited the Paris Exhibition. I infinitely preferred the one at Tashkent. Paris was too vast; Tashkent was small, and everything had the interest of comparative novelty. There were to be seen specimens of the products and industries of Turkistan. Cotton is the chief thing. The Russians have paid great attention to the improvement of the cotton grown in Central Asia. American seed has been introduced. It is mainly owing to the export of cotton that the Transcaspian Railway now pays its expenses. About 2000 tons are exported annually. Similar attention has been paid to wine-growing. General Annenkoff took us to see M.

Ivanoff's exhibits of local wines. We tasted some half-dozen varieties of red and white wines made in Turkistan. Two (one white and one red) were very fair. We shall, no doubt, have them ere long in the market under the name of white and red Bordeaux. Bessarabia, the Crimea, and the Caucasus also produce good sound wines. Yet few or none of these wines are known in the English market. I was shown at Tashkent Exhibition a long cane, called "Sorgot." The Russians intend to make sugar of it. The sugar-cane does not suit the Turkistan climate. It is expected that "sorgot" will pay well. There are thousands of acres of rice-fields in the valleys of the Zarafshan and the Chirchik, the rivers of Samarkand and Tashkent. General Annenkoff is right in saying that what is needed for the development of Russian Asia are railway extension and improved irrigation. I heard of several projects of irrigation while I was in Turkistan, which will, no doubt, be carried out, and much improve the country. Bokhara is very short of water, as Samarkand now monopolises most of the Zarafshan water. Silk, too, was a prominent feature of the Exhibition. One of the exhibitors was a Corsican, who had brought his eggs and cocoons all the way from Corsica. He proudly remarked that he was the only foreign exhibitor there. Near the entrance were to be seen trophies and reminiscences of the Russian conquest and annexation of Turkistan, which lasted, roughly, from 1863 to 1873. The mineralogical section exhibited specimens of coal, brass, lead, iron, salt, sulphur, ozokerit, etc. As Baku oil is likely to fail, it is well that Central Asia produces coal.

The Exhibition had also its agricultural, piscatorial, and military sections. The Transcaspian Railway was there in miniature. Maps, books, and photos of Central Asia were to be bought; so were beautifully illuminated Persian MSS.; but at a price that might suit the British Museum, but did not suit my pocket. Bokhara silks and embroideries, all sorts of furs, pottery, saddlery, jewellery, brass and leather-work, antique arms and armour, carpets, silks of all sorts, from a handkerchief to a large web. Very fine fruits, such as pears, apples, grapes, and melons, were there. In another part was the cattle and horse show. I saw two really good Turkoman horses there. There were two native bands, one brass and the other string; and the dancing, juggling, and castanet-playing were remarkable. Speaking of Turkoman horses, a Russian officer at Amu-darya showed me two young handsome ones. I am still, however, of opinion that the quality and endurance of the ordinary Turkoman horse are not superior to those of the Afghan, Persian, Arab, Karabraghi, or other good Asiatic strains.

And now I have come to the end of my task. There is one thing I wish to say a word about, and that is sport. It is to be hoped that Mr. Littledale on his return will tell us something of his sport on the Pamir and thereabouts. If any one wants good pheasant shooting, let him go to Dushakh and Merv, and then up the Murghab to Maruchak. There, too, he will find the boar and tiger. It is, however, difficult to ride pig in so close a country. One or two tigers were killed by Afghans and Turkomans in 1884-85, and in January 1888 my brother, Major Yate, shot one. There are lots of duck, snipe, and several varieties of par-

tridge. A sportsman might do worse than spend a few months on the Murghab and the Tejend. If he can get to the Tirband-i-Turkistan he will get good ibex, markhor, and uriyal shooting. The man who aims at the *Ovis poli* and *Ovis ammon* must penetrate to the Pamir and Tibet.

In returning from Tashkent we followed the route that we went by, and on the 9th of October we found ourselves at Tiflis. Here I left the rest of the party, and on the 12th left Batum in a tank-steamer (built of steel, specially for the oil trade) for Constantinople. When we were 70 miles from shore I could see 90 or 100 miles off the high ranges (12,000 to 15,000 feet high) of the Caucasus to the NE., and of Armenia towards Ararat to the SE., covered with snow from summit to the horizon. It was a sight not often seen. I reached Constantinople on the 15th, and then was so fortunate as to meet Professor Arminius Vambéry, the doyen of Central Asian travellers. I can conceive no more happy conclusion to a trip to Tashkent than the pleasure of discussing all I had seen with the man whose adventurous journey to Khiva, Bokhara, and Herat in 1863 is so well known.

It is very much to be hoped that in the future the Russians will allow us more facilities for travelling in Central Asia, and that they will more often visit India. We, at least, put no restrictions on them. The visit of the Tsarevitch will, let us hope, induce other Russians to visit India. They are most attentive to us in Central Asia, and we are quite ready to return the compliment in India. I had a conversation on this subject with a Russian Colonel at Tashkent. He mentioned three obstacles to Russian officers visiting India—viz., the want of funds, the difficulty of getting leave, and the fear of arousing our suspicions. The two first the Russian officers must get over themselves; if they will do so, and come to India, we will show them that the third is imaginary. British officers also will do well to visit Transcaspia and Turkistan. The military life there is akin to that which we lead along the North-West Frontier of India. There are many hints that we may pick up from the Russians in Central Asia to the advantage of our military and civil administration.

THE PHYSICAL CONDITIONS OF CENTRAL ASIA IN RELATION TO RUSSIAN COLONISATION.

(*Being the Abstract of a Paper read before the Imperial Geographical Society of St. Petersburg, March* 1889.)

By Lieutenant-General Annenkoff.

General Annenkoff commenced his lecture by referring to Southern Russia as a proof of the great results the energy of Russia is able to achieve in the field of colonisation. Within the last century and a half flourishing towns, such as Odessa, Rostov, Taganrog, Kherson, and Ekaterinoslav have sprung up, and on steppes formerly supposed to be suited only for a nomadic life there now dwells a fixed population of

ten millions, with a density of more than sixty to a square mile. This country, which now yields over two million quarters of different cereals, is capable of producing still more abundant crops if artificially irrigated, for the dryness of the soil is the sole cause of sterility. The district of Orenburg, Siberia, and Central Asia as a whole, but more especially Trans-Caspia, are also open to Russian enterprise, and may undergo the same transformation if conditions favourable to colonisation exist in these countries. To show that such conditions are actually found, General Annenkoff described the geographical features of the territory in question, giving in the first place a sketch of the general configuration of the Asiatic continent, which may be omitted, as a detailed description was published in the *Scottish Geographical Magazine*, vol. v., p. 148. He then proceeded to discuss the rivers and soil of the continent, drawing his information, for the most part, from the works of Reclus, Humboldt, Richthofen, and others. The large amount of earthy matter carried down by the principal rivers causes the formation of extensive deltas at their mouths, and constantly forces the rivers to form new channels, leaving the old beds and lake-basins dry. Thus, the mouth of the Whang-ho oscillates along some 560 miles of coast; and it has been calculated that the alluvium it deposits in twenty-five days would suffice to form an island about 1100 yards square and 118 feet deep, while the island of Tsung-ming, at the mouth of the Yang-tse-kiang, which is now some 380 square miles in extent, rose barely to the surface of the water, it is said, at the commencement of the Mongolian dominion. The character of the Amu-Daria is similar to that of these two rivers, and the absence of a delta at its mouth may be accounted for by the fact that it has flowed in its present bed for about 350 years only. Whereas, then, in the central parts of the continent the products of denudation, being transported only from one place to another in the neighbourhood of their origin, fill up the inequalities of the ground and tend to reduce the surface to a uniform level, on the outskirts of Asia they are carried by these rivers down towards the sea, where they form large tracts of alluvial soil and furnish the waters of the ocean with their necessary complement of salts. Consequently, in Central Asia are to be found many localities, clothed with a uniform vegetation and often of a saline character, where only a few insignificant oases afford conditions favourable for settled habitation and the progress of civilisation, whereas on the confines of the continent elevated land instead of plains, numerous rivers, valleys, etc., promote the development of a great diversity of organic life, and enable man to attain a higher standard of mental culture and political organisation.

Turning again to the Amu-Daria, General Annenkoff cited, as irrefragable proof of the fact that this river formerly flowed in other beds than the one it now occupies, the existence of the phenomena known as *shors* and *chinkis*, which have of late attracted attention. The *shors* are rows of cavities or embanked channels separated from one another by heaps of sand. Some are dry, others filled with water to the depth of one and a half to two feet. A succession of such *shors* forms a perfect representation of a river-bed dried up and in many places filled with sand, and there can be no doubt that they are abandoned channels of the

Amu-Daria. It has further been remarked that the country near the Kopet-Dagh slopes in the direction indicated by these lines of *shors*. Between Merv and the Amu-Daria exist as many as six of these ancient channels, and it is beyond doubt that in ancient times the sea extended to this country, and that the river formed a vast delta which embraced the plain of the Karakul as well as the six existing channels at Charjui. As time went on, and the sea receded towards the west, two principal streams were formed, the one flowing along the Kopet-Dagh and the other near Uzboï and the Sari-Kamish. The northern stream, increasing at the expense of the western, has gradually turned in the direction of the sea of Aral, and the latter has been reduced to a series of *shors* almost deprived of water.

The *chinkis* are long ranges of abrupt elevations, which may be attributed to the action of some force which has detached enormous masses of earth from the slopes, and piled them up at the foot of the mountains. The most remarkable of these *chinkis* is that of Unguz, measuring 330 miles in length; but others are to be found near the Gulf of the Tsarevitch (Dead Bay), between the Great Balkhans and Krasnovodsk, in the oasis of Khiva, and in other parts of the basins of the Caspian and Sea of Aral. Recent investigations have shown that an intimate connection exists between the general slope of the land and the position of the *chinkis*, and that water formerly flowed at the foot of all these elevations; and this opinion is confirmed by the fact that *chinkis* are found only where there are, or have been, currents—among the ramifications of the ancient beds of the Amu-Daria or on the banks of existing rivers.

The foregoing facts have an important bearing on the question of Central Asian colonisation, for along these river-beds lie deposits of fertile löss, a clayey soil formed by atmospheric agency, as is shown by the following observations:—Firstly, fresh-water shells are never found in the löss soil, but only those of land molluscs; secondly, bones of terrestrial mammals are found; and, thirdly, traces of vegetation have been discovered. The agents which have combined to form these deposits are rains, whereby the particles of soil set free from the mountains by atmospheric action have been washed down to the plain; winds, which have borne these particles along in certain fixed directions; and plants, which have preserved the accumulations from dispersion by the wind and have formed vegetable soil on their surface. From the geological map drawn up under the supervision of Professor Mushketoff and the mining engineers, Bogdanovitch and Obrutcheff, it appears that the whole country from Kizil-Arvat to Askhabad and the Atrek basin beyond are covered by a soil of compact löss, interrupted in a few places only by sand, as well as the country intersected by the beds of the Amu-Daria. The depth of this formation has been discovered, in the course of the construction of the Trans-Caspian Railway and at the sinking of Artesian wells, to be very considerable, sometimes amounting to several hundreds of feet; and chemical analysis has shown that the composition of this clay in Central Asia is identical with that of the alluvium of Chinese rivers. Now, the density of the population in China is due to the remarkable fertility of this soil, and even in the province of Trans-

Caspia, in spite of the defective cultivation of the Turkmans, extraordinary crops are produced where irrigation has been resorted to. Why, then, should not Russian colonists gain a living in this territory and extend the limits of cultivation? It is true that wide tracts are covered with sand; but room enough is left on fertile soil for the support of a large population, and if in some parts moving sands threaten ruin to agriculture, this is to a great extent the fault of man, who has stripped the country of the vegetation which held these sands in check. Since it has been forbidden to cut tamarisk and *saxaul* within a distance of five versts (about $3\frac{1}{2}$ miles) from the railway, vegetation has again sprung up on lands formerly bare, and the numerous experiments in plantation which have been made in the vicinity of the railway prove the possibility of contending with the sands. With regard to irrigation, General Annenkoff alluded to a project formed long ago in Bukhara to conduct the waters of the Amu-Daria by a canal into the Karakul. On looking at the belt of water, $2\frac{1}{2}$ miles broad, flowing in the bed of that river with great velocity, no one can doubt the practicability of the scheme. Nor will the Emir be embarrassed by any monetary difficulty, for the people, accustomed to forced labour, will present themselves for the work, provided with tools and provisions.

Though, however, the province of Trans-Caspia is on a par with China as regards the quality of its soil, the latter country has the advantage of a moister climate, in consequence of its proximity to the Pacific. But the rainfall of Central Asia is much larger than is generally supposed. During three months of 1885 and four months of 1886 a total fall of 65 inches was recorded at the meteorological station in Merv. A comparison with the rainfall of Southern Russia, barely 8 inches, and of other countries, shows that there is no lack of moisture in Central Asia. But these figures are no criterion of the benefit derived from the humidity of the atmosphere, for the rainfall is distributed very irregularly over the months of the year, and a great portion is evaporated, owing to the high temperature, before it has had time to make its influence felt. Artificial irrigation may do much to modify the existing conditions of the country by utilising the abundant supplies of water in the rivers, of which some, as the Tejend and the Murghab, now lose themselves in the sand, while others waste their water in the deltas and marshes of their estuaries. Improvements have indeed been introduced here and there, but by such primitive methods that no important results have followed.

M. Reclus asserts that the soil of Central Asia is capable of supporting five times the actual population if only the löss tracts be cultivated and irrigated from rivers which have hitherto been neglected. History also shows that the regions in question are unquestionably capable of cultivation, for in the time of Alexander luxuriant plains and a population of twenty to thirty millions existed where there is now a barren desert.

The Trans-Caspian railway cannot fail to give important aid to the development of this country, and will render possible the exploitation of its mineral wealth. Details have been given by Professor Vambéry of the minerals and lapis-lazuli of the Badakshan and the silver mines of the Shaikh Jaili mountains.

In conclusion, General Annenkoff advises that measures should be taken to direct the flow of immigration into Central Asia, for when left to themselves colonists often wander for months without finding suitable spots on which to settle, thus exhausting their resources and physical energy.

Doubtless many people wish to emigrate to Central Asia ; indeed, a certain number have already appeared there, but they arrive without knowing where to go, how to distinguish between cultivable and really sterile lands, ignorant of the local methods of agriculture and the tools to employ, and, in short, of all the laws of existence in the country and the proper method of beginning work. Thus, Government co-operation would be of immense value to the emigrants in the following directions :—

(1.) Preparing exact topographical maps showing the lands fit for colonisation.

(2.) Studying the best systems of irrigation, and carrying out the projects which up to the present have been found practicable.

(3.) Organising in the most important centres schools of agriculture according to the type elaborated by the Crown Lands Office. To these model-farms should be attached, the chief object of which ought to be to instruct the colonist in the cultivation of those crops which offer the best chance of success, and, consequently, have the greatest tendency to promote the well-being of the agriculturist.

ON THE SCIENTIFIC RESULTS OF DR. NANSEN'S EXPEDITION.

I.—Geology.

By Professor J. Geikie, D.C.L., LL.D., F.R.S.

In the Appendix to his most interesting and instructive work, *The First Crossing of Greenland*, Dr. Nansen treats of the scientific results of his remarkable journey. The detailed enumeration of these results, he tells us, would have been out of place in a general account of his expedition, but will appear in due time elsewhere. Hence he confines attention in his present work to such questions as are of most obvious interest, such as the extent, outward form, and elevation of the inland ice of Greenland. By way of introduction his readers are presented with some account of the geological history of the country, which, although it contains nothing that was not already familiar to geologists, will doubtless prove interesting to others. After indicating that Greenland would appear to be composed almost exclusively of Archæan schists and granitoid eruptive rocks, the author glances at the evidence which the Mesozoic and Cainozoic strata of the west coast have supplied as to the former prevalence of genial climatic conditions. Heer is cited to show that during the formation of the Cretaceous beds the mean temperature of North Greenland was probably between 70° and 72° F., while in later Cainozoic times it could not have been less than 55° F. in 70° N.L. Of course these conclusions are based on the character of the fossil floras. Now the mean annual temperature on the west coast of Greenland, where

the relics of these old floras occur, is about 15° F., from which it is inferred that there has been a decrease of 40° since Cainozoic times. In those times, says Dr. Nansen, "the country must have rejoiced in a climate similar to that of Naples, while in the earlier Cretaceous period it must have resembled that of Egypt." He then refers to the well-known fact that, long after the deposition of the Cainozoic beds of Greenland, intensely Arctic conditions supervened, when the inland ice of that country extended much beyond its present limits. This was the glacial period of geologists, during which all the northern regions of America and Europe, down to what are now temperate latitudes, were likewise swathed in ice. Various hypotheses have been advanced in explanation of these strange climatic vicissitudes, and some of them are very briefly discussed by Dr. Nansen. None of the suggested solutions of the problem quite satisfies him; but he appears to look with most favour on the view that great climatic revolutions in what are now polar regions may have resulted from movements of the earth's axis. He admits, however, that there are certain strong objections to this hypothesis, and concludes that we have not yet got any satisfactory explanation to cover all the facts of the case. In discussing the question of a possible wandering of the pole, the author cites certain astronomical observations to show that the position of the axis is even now slowly changing, the movement amounting to half a second in six months. This is not much; but if the change, as he remarks, were to continue at the same rate for 3600 years, the shift would amount to one degree. Thus in a period of no more than 72,000 to 108,000 years Greenland might be brought into the latitude required for the growth of such floras as those of Cainozoic and Mesozoic times. Geologists will readily concede these or longer periods if they be required, but they will have graver doubts than Dr. Nansen as to whether any such great changes in the axis are possible. The astronomical observations referred to, even if they were fully confirmed, do not show that the movement is constant in one direction. They indicated, as he mentions, a slight increase of latitude during the first quarter of 1889, followed in the second quarter of the same year by a decrease, which continued to January 1890. Since the publication of Professor George Darwin's masterly paper on the influence of geological changes on the earth's axis of rotation, geologists have felt assured that the great climatic revolutions to which the stratified rocks bear witness must be otherwise explained than by a wandering of the pole. Indeed, the geological evidence alone is enough to show that profound climatic changes have taken place while the pole has occupied its present position. Thus, there are no reasonable grounds for doubting that during the Glacial period the pole was then just where we find it to-day. For, under existing geographical conditions, could a sufficient lowering of temperature be brought about, snow-fields and ice-sheets would gather and increase over the very same areas as we know were glaciated in Pleistocene times. Further, we have only to recall the fact that several extreme revolutions of climate supervened during the so-called Glacial period, to see how impossible it is to account for the phenomena by movements of the earth's axis.

If it be true that the great climatic changes of the Pleistocene period did not result from a wandering to and fro of the pole, then it is not at all likely that the Mesozoic and Cainozoic climates of Greenland were induced by any such movement. But does the geological evidence justify us in believing that the climates in Greenland during Cretaceous and Tertiary times really resembled those of Egypt and Southern Italy? It may be strongly doubted if it does. Palæontologists, like other mortals, find it hard to escape the influence of environment. They are apt to project the actual present into the past, without, perhaps, fully considering how far they are justified in doing so. Because there occur in Cretaceous and Tertiary strata, within Arctic regions, certain assemblages of plants which find their nearest representatives in Southern Italy and Egypt, surely it is rather rash to conclude that Greenland has experienced climates like those now characteristic of Mediterranean lands. All that the evidence really entitles us to assume is simply that the *winter temperature* of Greenland was formerly much higher than it is now. That great caution is required in comparing past with present climatological conditions may be seen by glancing for a moment at the character of the flora which lived in Europe during the inter-glacial phase of the Pleistocene period. The plants of that period are for the most part living species, so that while dealing with these we are on safer ground than when we are treating of the floras of periods so far removed from us as those of Tertiary and Cretaceous times. Now, in the Pleistocene flora of Europe we find a strange commingling of species, such as we nowhere see to-day over any equally wide area of the earth's surface. During Pleistocene times many plants, which are still indigenous to Southern France, flourished side by side in that area with species which are no longer seen in the same region; some of these last having retreated because unable to support the cold of winter, while others have retired to the mountains to escape the dryness of the summer. Similar evidence is forthcoming from the Pleistocene accumulations of Italy, Northern France, and Germany. In a word, clement winters and relatively cool and humid summers permitted the wide diffusion and intimate association of plants which have now a very different distribution, temperate and southern species formerly flourishing together over vast areas of Southern and Central Europe. And similarly we find that during the same period the regions in question were tenanted by southern and temperate forms of animal life—elephants, rhinoceroses, and hippopotamuses, together with cervine, bovine, and other forms, not a few of which are still indigenous to our continent—that ranged from the shores of the Mediterranean up to our own latitudes. We cannot doubt, indeed, that the present geographical distribution of plants and animals differs markedly from anything that has yet been disclosed by the researches of geologists. The climatic conditions of our day are exceptional as compared with those of earlier times, and the occurrence in Greenland of southern types of plants, therefore, does not justify us in concluding that climates like those of Southern Italy and Egypt were ever characteristic of Arctic regions. It is a low winter temperature rather than a want of great summer heat that restricts the range northward of southern floras. If Greenland could be divested of

its inland ice—if its winter temperature never fell below that of our own island—it would doubtless become clothed in time with an abundant temperate flora.

Judging from what is known of the various floras and faunas that have successively clothed and peopled the world, from Palæozoic down to the close of Cainozoic times, the general climatic conditions of the globe, prior to the Glacial period, would seem to have been prevalently insular rather than continental as they are now. The lands appear to have been formerly much less continuous, and ocean currents from southern latitudes had consequently freer access to high northern regions than is at present possible. In no other way can we account for the facts connected with the geographical distribution and extent of the fossiliferous formations. But are we to infer, from the occurrence of similar assemblages of marine organic remains in Arctic, Temperate, and Tropical latitudes, that the shores of primeval Greenland were washed by waters as warm as those of the tropics? Surely not: an absence of very cold water in the far north is all that we seem justified in assuming. And so, in like manner, the presence in Greenland of fossil floras having the same general facies as those that occur in the corresponding strata of more southern latitudes, does not compel us to believe that conditions at all similar to what are now met with in warm-temperate and sub-tropical lands ever obtained in Arctic regions. A relatively high winter temperature alone would permit the range northward of many tribes of plants which are now restricted to southern latitudes. Yet, under the most uniform insular climatic conditions that we can conceive of, there must always have been differences due to latitude—although such differences were never apparently so marked as they are now.

In order to appreciate the character of the climate which must have prevailed when the lands of the globe were much more interrupted and insular than at present, we have only to consider how greatly isothermal lines, even under existing continental conditions, are deflected by ocean currents. In the North Atlantic, for example, the winter isotherm of 32° F. is deflected northward from the parallel of New York to that of Hammerfest—a displacement of at least 30° of latitude. The Arctic Sea now occupies a partially closed basin, into which only one considerable current enters from the south. But in earlier ages the case was otherwise, and there were often communications across what are now our continental areas. Instead of being girdled, as at present, by an almost continuous land-mass, the Arctic Sea seems to have formed with the circumjacent ocean one great archipelago. Thus freely open to the influx of southern currents, it is not difficult to believe that the seas of the far north might never be frozen, and that an "inland ice" like that of Greenland would be impossible. The present cold summers of that country, as the late Dr. Croll has insisted, are due not so much to high latitude as to the presence of snow and ice. Could these be removed, the summers would be as warm at least as those of England. Now the occurrence in Arctic regions of Palæozoic and Mesozoic marine faunas is strongly suggestive of the former presence there of genial waters having free communication with lower latitudes; and it is to the presence of

these warm currents, flowing uninterruptedly through polar regions, that we would attribute the high winter temperature and uniform climate to which the fossil floras and faunas of Greenland bear testimony.

If these views be at all reasonable, it seems unnecessary to call to our aid hypothetical changes in the position of the earth's axis. It may be admitted, however, that the climate of the Arctic regions must have been from time to time more or less affected by those cosmical causes to which Croll has appealed. So long, however, as insular conditions prevailed, the changes induced by a great increase in the eccentricity of the earth's orbit would not necessarily be strongly marked. Dr. Nansen objects to Croll's well-known theory that "it cannot account for the recurrence of conditions so favourable as to explain the existence in Greenland of a climate comparable to what we now find in Tropical regions." No doubt it cannot, but, as we maintain, there is no good reason for supposing that tropical or sub-tropical climates ever characterised any area within the Arctic Circle. The remarkable association in Europe, during so recent a period as the Pleistocene, of southern and temperate species of plants and animals, ought to warn us against taking the present distribution of life-forms as an exact type of the kind of distribution which characterised earlier ages. It is safe to say that were our present continental areas to become broken up into groups of larger and smaller islands, so as to allow of a much less impeded oceanic circulation, the resulting climatic conditions would offer the strongest contrast to the present. And as the lands of the globe were apparently in former times more insular than they are now, it is hazardous to compare the climates of the present with those of the past. It is reasonable to infer, from the occurrence in Greenland of fossil floras which find their nearest representatives in Southern Europe and North Africa, that the winters of the far north were formerly mild and clement. But we cannot conclude, from the same evidence, that the Arctic summers were ever as hot as those of our present warm-temperate and sub-tropical zones.

But if the recent expedition has thrown no new light on the disputed question as to the cause of the high temperature which formerly prevailed in Greenland, it is needless to say that it has added considerably to our knowledge of the present physical conditions of that country. The view held by many that Greenland must be wrapped in ice has been amply justified, and we can now no longer doubt that the inland ice covers the whole country from the 75th parallel southwards. A section of Greenland in the latitude at which it was crossed by Nansen and his comrades "gives an almost exact mathematical curve, approximating very closely to the arc of a circle described with a radius of about 6500 miles. The whole way across the surface coincides tolerably accurately with this arc, though it falls away somewhat abruptly at the coasts, and a little more abruptly on the east side than the west." Taking the observations of other Arctic travellers with his own, Nansen is led to the conclusion that "the surface of the inland ice forms part of a remarkably regular cylinder, the radius of which nevertheless varies not a little at different latitudes, increasing markedly from the south, and consequently making the arc of the surface flatter and flatter as it advances northwards." He points out

that this remarkable configuration must to a certain extent be independent of the form of the underlying land-surface, which, to judge from the character of the wild and mountainous coast-lands, probably resembles Norway in its general configuration—if, indeed, it be not a group of mountainous islands. The buried interior of Greenland must in fact be a region of high mountains and deep valleys, all of which have totally disappeared under the enveloping *mer de glace*. It is obvious, as Dr. Nansen remarks, that the minor irregularities of the land "have had no influence whatever upon the form of the upper surface of the ice-sheet." That form has simply been determined by the force of pressure—the quasi-viscous mass attaining its maximum thickness towards the central line of the country, where resistance to the movement due to pressure must necessarily have been greatest. Thus although the larger features of the ice-drowned land may have had some influence in determining the position of the ice-shed, it is not by any means certain that this central line coincides with the dominant ridge or water-shed of the land itself. For, as Nansen reminds us, the ice-shed of the Scandinavian inland ice of glacial times certainly lay about 100 miles to the east of the main water-parting of Norway and Sweden. Similar facts, we may add, have been noticed in connection with the old ice-sheets of Scotland and Ireland.

The greatest elevation attained by the expedition was 9000 feet. How deeply buried the dominating parts of the land surface may be at that elevation one cannot tell. It is obvious, however, that the *mer de glace* must be very unequal in thickness. According to Dr. Nansen the average elevation of the valleys in the interior cannot much exceed 1000 or 2000 feet, so that the ice lying above such depressions must have a thickness of 5000 or 6000 feet. It cannot, of course, lie so deeply over the mountain ridges. The eroding power of such a glacier mass must be enormous, and Dr. Nansen does not doubt that the buried valleys of Greenland are being widened and deepened by the grinding of the great ice-streams that are ever advancing towards the sea.

The expedition met with no streams of surface-water on the inland ice; indeed, the amount of superficial melting in the interior was quite insignificant. And yet, as is well known, many considerable streams and rivers flow out from underneath the inland ice all the year round. It is obvious, therefore, that this water supply does not come from superficial sources, as, according to Dr. Nansen, it is usually supposed to do. But surely it has long been recognised that such rivers as the Mary Minturn must be derived from sub-glacial melting. And the various causes to which our author attributes this melting have already frequently been pointed out. Earth-heat—the influence of pressure in lowering the melting-point of ice—and the friction induced by the movement of the ice itself have all long ago been recognised as factors tending to produce the sub-glacial water-drainage of an ice-sheet.

Dr. Nansen's speculations on the origin of the "drumlins" and "kames" of formerly glaciated areas will interest geologists, but are not so novel as he supposes. His description of what are known as "drumlins" is not quite correct. These long lenticular banks cannot be

said to lie upon boulder-clay, but are merely a structural form of that accumulation. And it is hardly the case that geologists have "performed the most acrobatic feats" in trying to explain the origin of the banks in question. The usual explanation is that they have been formed underneath the ice as ground-moraine—the upper surface of which varies in configuration—being sometimes approximately even, as in broad mountain valleys; at other times ridged and corrugated, as in open lowlands. And these modifications of surface are supposed to have resulted from the varying movement and pressure of the overlying ice-sheet. The drumlins, in fact, would appear to be analogous to the banks that accumulate in the beds of rivers. Many drumlins, indeed, are composed partly of solid rock and partly of boulder-clay, which would seem to have accumulated in the lee of the projecting rock, much in the same way as gravel and sand gather behind any large boulder in a stream-course. Dr. Nansen, apparently, to some extent confounds drumlins with "kames" and "åsar," of which certainly many strange and conflicting explanations have been hazarded. These, however, differ essentially from drumlins, for they consist exclusively, or almost exclusively, of water-worn and more or less water-assorted materials. And the most generally accepted view of their origin is that they have accumulated in tunnels underneath an ice-sheet. This is practically the same view as Dr. Nansen's. He thinks that when an ice-sheet has its under surface furrowed by running water, the ground-moraine will tend to be pressed up into the river-channels. The water will, in this way, be compelled to hollow out the roof of its tunnel to a greater degree, and as the stream continues to work upwards the moraine will follow it, so as to partially fill the tunnel and form a ridge along the back of which the sub-glacial stream will run. The material forming the upper portion of the ridge will thus come to be composed mainly of water-worn and stratified detritus, derived from the erosion of the ground-moraine. This is an ingenious suggestion which may be of good service in some cases, but it is certainly inapplicable to most kames and åsar. If it were a complete explanation we ought to find these ridges consisting of an upper water-assorted portion and a lower unmodified morainic portion (boulder-clay). But this is not the case, for most kames consist entirely, from top to bottom, of water-assorted materials. They are found running across an even or gently undulating surface of boulder-clay, and sometimes they rest not on boulder-clay but solid rock.

Dr. Nansen considers another geological question which has given rise to much controversy, and is still far from being settled—namely, whether the oscillations of level which have left such conspicuous traces in northern regions are in any way connected with the appearance and disappearance of great ice-sheets. Can a big ice-sheet push down the earth's crust by its weight? and does the crust rise again as the ice melts away? Could a thick ice-sheet exercise sufficient attraction upon the sea to cause it to rise upon the land, and thus explain the origin of some of the so-called raised beaches of this and other formerly glaciated lands? Can the weight of a great ice-sheet shift the earth's centre of gravity, and, if so, to what extent? Each of these questions has been

answered in the affirmative and the negative by controversialists, and, until the geological evidence has been completely sifted, each, doubtless, will continue to be alternately affirmed and denied. All that need be pointed out here is that some of the movements which occurred during the Pleistocene period were on much too large a scale to be explicable by any of the hypotheses referred to.

OBITUARY: 1890.

Berghaus, Hermann.—No name is better known to geographers than that of "Berghaus"—uncle and nephew—who have, each in his time, produced the most famous cartographical works of the century. The uncle, Dr. Heinrich Berghaus, who died in 1884, at the ripe age of eighty-seven, was the author of the first great Physical Atlas, well known in this country as being the basis of Keith Johnston's. The nephew, Dr. Hermann Berghaus, who died at Gotha, 3d December 1890, may be said to have continued and completed the work of his uncle. The third son of the Evangelical preacher Johann Berghaus, he was born at Herford, in Westphalia, 16th November 1828. Most of his life was spent at Gotha, where in 1850 he entered the Geographical Institute of Justus Perthes, just four years before Petermann went there. In Gotha he led an active life of study and work, which has been prolific in producing many valuable and original maps. Among his first works may be mentioned the physical map in *Stieler's Hand-Atlas* and *Stieler's Schul-Atlas*, also many miscellaneous school atlases, maps, and physical wall-maps. In 1861 he produced his *Karte des Oetzthales Gletschergebietes*; in 1863 his well-known *Chart of the World*, which has gone through many editions; in 1875, *Physikalische Wandkarte von Europa*; in 1878, *Karte der Alpen*; in 1881, *Physikalische Wandkarte von Afrika*. These works, however, are of but minor importance compared with his last work, *Berghaus Physikalischer Atlas*. Planned and worked out with the assistance of all the leading scientific geographers in Germany, it is undoubtedly the greatest work on physical geography at the present day, and will prove a lasting monument to Hermann Berghaus, although he has not lived to see it completed.—J.G.B.

Burton, Sir Richard F., K.C.M.G.—By the death of Sir Richard F. Burton England has lost one of her most daring and successful travellers and explorers, a scholar of rare literary and scientific acquirements, and a gifted writer. He died on the 20th of October at Trieste, where he had filled the office of British Consul since 1872. He was born in 1821 at Barham House in Hertfordshire, and was the son of Colonel Netterville Burton of the 36th Regiment. He is said to have inherited from both sides of his parentage the wilful disposition and the love of unfettered action which were predominant elements in his character, and which had a great influence in the shaping of his destiny. In his early years he was left very much to his own devices. His education also was of the most desultory nature, and but little calculated to train him to habits of subordination. The most part, in fact, of his boyhood and youth

he spent on the Continent with his father, whose nomadic propensities never allowed him to settle for long in one place. To young Burton, however, this wandering life had its own advantages. He had keen powers of observation, and much was given him to observe. He had also a marvellous faculty for the acquisition of languages, and for the exercise of this faculty his changes of residence from country to country gave him the best of opportunities. His family returned to England in 1840, and he was then sent to Oxford. But, before completing his terms, he was dismissed from that seat of learning for contumacious disregard of its rules of discipline. During his residence, however, he had applied himself so zealously to the study of Arabic that before leaving he had mastered that difficult language. From the university he returned to his friends in London, who procured for him a commission in the East India Company's Service. He landed at Bombay towards the end of 1842, and thence proceeded to Baroda to join the regiment to which he had been posted as ensign. Here he displeased his superior officers by such eccentricities of conduct as had cut short his academic career. He was nevertheless promoted to the office of regimental interpreter, for which his accurate knowledge of Arabic, Persian, and Hindustani fully qualified him. He served in the brilliant campaign of 1843, in which Sir Charles Napier crushed the power of the Mohammedan rulers of Sind. The war over, he made excursions to explore some of the less-known parts of India.

In 1852 he first established his reputation as a most daring explorer by his journey to Mecca and Medina, which he undertook in the disguise of an Afghan pilgrim. Few records of travel are fuller of absorbing interest than the narrative in which he describes his perilous adventures on this pseudo-pilgrimage. His next expedition was to Somál-land, and in this he was accompanied by Lieutenant Speke. Here he made another pilgrimage scarcely less hazardous than the former; for, disguising himself as an Arab, he made his way alone to the sacred city of Harar, which, though known at one time to the Portuguese by name, had never been visited by a European. We find him next serving in the Crimean war, in the capacity of chief of the staff to General Beatson.

In his next expedition, which he made in 1857, in association again with Speke and under the auspices of the Royal Geographical Society, he crowned his fame by the discovery of Lake Tanganyika, rumours of the existence of which had been brought to the Coast by Arab traders and by missionaries. The success of this important undertaking was due mainly to Burton, whose familiarity with the Arab dialects enabled him to obtain from the Arab traders he encountered on the way a knowledge of the proper route for reaching the lake. The travellers, after many trials and sufferings, reached Ujiji in the middle of February 1858, about eight months after they had started from Bagamoyo. In the course of the expedition Speke, who had to leave Burton invalided at Kagé, reached the shores of the Victoria Nyanza, which he considered at the time, and afterwards practically proved, to belong to the Nile system. Burton took a different view, and hence arose a controversy between the two

travellers which was cut short so tragically on the very eve of its being brought to an issue in a public discussion. On returning to England in 1859, Captain Burton was recognised as an explorer of the first rank, and, besides other honours, was awarded the gold medal of the Royal Geographical Society of London.

In the following year he made a trip to the United States, in the course of which he visited Salt Lake City and other western parts. His marriage, which followed in 1861, proved conducive in no ordinary degree to his comfort and happiness throughout the rest of his life. Some months afterwards he sailed with his bride for Fernando Po, to which he had been appointed Consul, and where he was stationed for three years. He now visited the Mount Cameroons, explored the coast from the Congo to Cape Coast Castle, and went on a mission to the King of Dahomé. In 1865 he was promoted to the Consulate at Santos in Brazil, where he indulged as usual his passion for exploration. After visiting the La Plata States and the Brazilian highlands he crossed the continent to Chili and Peru, and returned to his headquarters at Santos by the Straits of Magellan.

From Brazil he was transferred to Damascus, which he made the basis of excursions to several unexplored parts of Syria. He returned to England in 1871, and thence made a voyage to Iceland, about which he wrote an elaborate work. He was then appointed to succeed Mr. Charles Lever in the Consulate at Trieste, and this post he held till his death. In 1876, and again in the subsequent year, he visited the Land of Midian for the purpose of exploring its old mines and ruined cities. Four years later he joined Commander Cameron in an expedition into the interior of Guinea to search for gold. Gold was found, but not in such quantities as to recoup the travellers for their outlay. The enterprise, however, made some contributions to the science of natural history, and established the fact that a Stone Age had existed on the Gold Coast. After this the great traveller's health broke down, and his subsequent labours, beyond the official, were of a literary nature.

He was a very voluminous writer, on a variety of subjects. Each of his expeditions was followed by a published narrative of its incidents. He was the author of no fewer than seventy-nine works, of which thirty-nine are books of travel. Among these the following may be enumerated:— *Sindé, Goa and the Blue Mountains*, *Pilgrimage to El Medina and Mecca*, *First Footsteps in East Africa*, *The Lake Regions of Central Africa*, *The City of the Saints*, *Wanderings in West Africa*, and *The Nile Basin*. Amongst the works on other subjects may be mentioned: *A History of the Sword*, a literal translation of *The Arabian Nights*, and a poetical translation of the *Os Lusiadas* of Camoens. The last-named work has been praised as "a masterly performance, abounding with the most recondite and learned annotations." His writings are quite a mine of valuable information on all the subjects of which they treat. Their style, however, is not popular, and they are somewhat difficult reading. He was perhaps the foremost linguist of his day. He knew no fewer than thirty-five languages, not only colloquially but also critically.

Surprise has often been felt that a man of his extraordinary attainments and almost unequalled services in exploration and to science should have received neither public reward nor recognition, beyond a knighthood bestowed at a very late period in his life. To himself this was a matter of indifference, nay, probably even of choice, for he could not endure restraint, and, above all else, he valued independence, and was always a rule to himself. Thus, though he discharged efficiently his official duties, he was never an official favourite. He had one of Byron's peculiarities, for he indulged the whim, we are told, of telling anecdotes about himself, in which he put his own share in the transaction in the blackest possible light. His talk had, besides, at times a sharp flavour of cynicism. His character, however, had many genial elements. He was a warm and fast friend. He never bore malice, and was remarkably free from all jealousy. He is said to have been simply idolised by the English colony in Trieste and by all those with whom he there came in contact. In looking at his character and achievements we are strongly reminded of those heroic dare-devil adventurers whose romantic exploits signalised the reigns of Elizabeth and her immediate successor. The world will not soon see his like again.—J. W. M'C.

Croll, James, LL.D., F.R.S.—On the 15th of last month there passed away a devoted student of science, of whom Scotland may well be proud. Of humble social position, Mr. Croll enjoyed no advantages in the matter of early scientific education, and may be said to have been self-taught. His successful career affords another bright example of what may be achieved by one endowed with natural abilities and the indomitable resolution to overcome all difficulties. One of his very earliest papers, *On the Physical Cause of the Change of Climate during Geological Epochs* (1864), succeeded in at once arresting the attention of physicists and geologists, and gave rise to a prolonged discussion in which Croll greatly distinguished himself. A long succession of papers, all bearing more or less directly upon the subject of climatic change, followed from his pen. Among the most remarkable are a series on ocean-currents, published in the *Philosophical Magazine*, in which he controverted the views of Maury, Carpenter, and others, and maintained that the grand system of oceanic circulation was produced "not by the trade-winds alone, nor by the prevailing winds proper alone, but by the combined action of all the prevailing winds of the globe, regarded as one system of circulation." In his masterly work, *Climate and Time* (1875), he incorporated the substance of these and other contributions to physical science. This work produced a great effect upon geological thought—even those who were slow to admit its conclusions being yet ready to acknowledge its originality and power. It is upon this work that Croll's reputation will chiefly rest, and he will doubtless continue to be cited as an authority on the topics discussed therein. In the controversies to which it gave rise, Croll took an animated part,—his replies to opponents being characterised by his usual philosophical breadth of view. These controversial papers he subsequently collected, and with some additional matter published under the title of *Climate and Cosmology*

(1885), a work which may thus be considered as supplementary to its elder brother. It deals, however, with certain other subjects, such as the origin and age of the sun's heat and the origin of nebulæ. These and similar large questions in physical science had a fascination for Croll; and only last year he issued a suggestive work on *Stellar Evolution*. In this he forcibly states the geological argument against the views held by Thomson, Tait, and others, with regard to the age of the sun's heat. Like many another Scotsman, he was deeply interested also in metaphysical problems, and was the author of a work entitled the *Philosophy of Theism*. In the preface to his *Climate and Cosmology*, he says he could have wished to consider more fully many of the topics discussed in that volume, "but," he pathetically remarks, "advancing years and declining health constrain me to husband my remaining energies for work in a wholly different field of inquiry." This work—*The Philosophical Basis of Evolution*—he had just seen through the press when he died.

Dr. Croll was for many years subject to a painful illness which greatly hampered him in his literary labours, and finally forced him to retire from his post on the staff of the Geological Survey of Scotland, on a pension which even the most fanatical advocate of departmental economy would not describe as liberal. In spite of illness and straitened circumstances, however, Croll stuck to his scientific work, and, as just stated, died at last in harness.—J. G.

James, Frank Linsly, M.A., F.R.G.S.—This capable African explorer was, unfortunately, suddenly cut off in middle life, on the 21st of April last, being killed by a wounded elephant at San Benito on the West Coast of Africa. He was born at Liverpool in 1851, and in 1869 entered Cambridge University, where he took the degree of M.A. Early in life he showed a taste for travel. During the winter of 1877-78, accompanied by his younger brother, he made an expedition to the Súdan. Having ascended the Nile to Korosko and crossed the desert on camels to Abu-Hammed, the travellers thence followed the right bank of the Nile up to the confluence of the Atbara. They ascended the latter river and its tributary, the Bahr Setit, up to the borders of Abyssinia, and made the return journey by Kassala and Berber and through the desert to Dongola, whence they dropped down the Nile to Cairo. Mr. James undertook another African journey in the winter of 1880-81. Starting on this occasion from Massawa, and passing through Keren, he gained the Khor Baraka, the upper reaches of which he explored and carefully mapped. In the course of the following winter he successfully explored the Basé country, which he entered by way of Sawakin, Kassala, and Haikota. An account of this region is to be found in his first published work, *The Wild Tribes of the Soudan*. In the following winter he visited Mexico, and in the next, besides making a short trip into Southern Arabia, he cruised along the Somál coast in an Arab dhow, to see under what conditions he might hope to make a successful journey into the Interior. Somál-land had up to that time, with the exception of the coast region, remained all but unknown to Europeans. Several attempts had indeed been made to penetrate farther inland, but

the goal aimed at by most of the explorers was only the coastal range, bordering the Gulf of Aden. Travellers who had ventured beyond were either murdered or found native greed and treachery, tribal feuds and tribal fights, an impassable barrier. James resolved to face all risks, and at Berbera organised an expedition, at the head of which he hoped to strike the Webi Shebeli or Leopard River, which was reported to flow through Somál-land far south of Berbera, and long before it loses itself in marshes near the Indian Ocean, about a degree to the north of the Equator. He started on the 21st of December 1884, and in fifty-nine days, after surmounting difficulties and dangers without number, had the satisfaction of reaching the Webi Shebeli, where its stream had a width of about sixty yards. The regions he had traversed abounded with all sorts of wild animals, elephants, rhinoceroses, lions, leopards, giraffes, zebras, hyænas, and antelopes of all kinds and sizes. He regained Berbera on the 16th of April 1885. Lord Aberdare, in his Annual Address of that year, on the progress of Geography, characterised the expedition as one of the most interesting and difficult feats of contemporary African travel. Three years afterwards James published his narrative of the expedition (now in a second edition), under the title of *The Unknown Horn of Africa*. It is a work full of most interesting information and written in a very bright vein. In perusing it one can see that the author's success as an explorer was mainly due to his fearless disregard of danger and his firmness of purpose, combined with great tact and a strong sense of the obligations of justice. During the remainder of his life he devoted much time to yachting, and thus saw much of the world, visiting the Persian Gulf, India, Spitzbergen, Novaya Zemlya, the Kara Sea, the river Niger, Fernando Po, and the Cameroons.—J. W. M'C.

M'Cormick, Robert.—In October last the decease was announced of Mr. M'Cormick, who upwards of forty years ago did some good service in the cause of Polar exploration. In 1839 he accompanied, as chief medical officer, the *Erebus* and *Terror* expedition, which, under the command of Captain (afterwards Sir) James C. Ross, proceeded to the Antarctic Ocean and discovered Victoria Land, the coast of which it traced from lat. 71° to 78° 10′, having thus approached to within 160 miles of the South Magnetic Pole. In addition to his medical duties M'Cormick was charged with the investigation of the geology and natural history of such regions as might be discovered in the course of the voyage. In 1847 the results of the expedition were given to the world in a work by its commander, entitled: *A Voyage of Discovery and Research in Southern and Antarctic Regions*, 1839-1843. This work supplied much important information on magnetism and the subjects specially intrusted to Mr. M'Cormick. He afterwards joined an expedition to the Arctic seas, in the course of which he made an exploring voyage in an open boat up the Wellington Channel. His services do not appear to have ever received adequate recognition.—J. W. M'C.

Metzger, Karl Albert Emil, born at Coblentz on 19th October 1836, was gazetted second-lieutenant in the Prussian Engineers (Pioneer

Corps) in 1856; but in the following year he volunteered into the Dutch service, and was sent out to Java. There, recommended by Duke Bernhard of Saxe-Weimar, ex-governor of Java, Herr Metzger was rapidly promoted, and employed in positions of trust, first in the Engineers, and afterwards (from 1861) in the Trigonometrical Survey Department, until in 1874 he was appointed head of the second section of that department. During the years 1865 to 1875 he was actively engaged in the actual work of triangulation in the western regencies of Java, the famous Krakatoa falling within the sphere of his operations: he made it a station when connecting the triangulation of Java with that of Sumatra. In 1875 he came to Europe on leave, but never returned to the East. He settled in Stuttgart, and from that time devoted himself to geographical study. He had an intimate knowledge of the East Indies, was a constant contributor of important reviews and information affecting that part of the world to *Petermann's Mitteilungen*, *Globus*, our own *Magazine*—he was an Honorary Corresponding Member of our Society from the very first—*Die Kolonialzeitung*, *Oesterreichische Monatsschrift für den Orient*, and *Export* (of Berlin), besides occasional papers to several other magazines, including *Das Ausland* and the London *Nature*. But his labours, and his interest in geographical matters, were not confined to the East; he wrote on Africa and various other parts of the world. For Petermann's well-known organ he prepared a monograph on the great Krakatoa eruption of 1885. His most ambitious work was a *Weltlexikon* or *Gazetteer of the World* (1888), intended principally for the use of those engaged in commercial and industrial pursuits. During the last few years of his life—he died on 6th July 1890—he was the acting secretary of the Würtemberg Society for Commercial Geography, and in fulfilment of the duties of that office prepared the annual reports, delivered lectures, and in 1889 wrote, for presentation at the Paris Geographical Conference, an excellent little book on the explorers and travellers of the current century who have been connected with Würtemberg. In addition to his extensive geographical knowledge, he was an accomplished linguist, a good mathematician, and a man of wide and catholic reading in the chief literatures of Europe; for English he had an especial predilection. With all this he was one of the most modest of men, honoured by those who knew him for his sterling manliness and his unvarying courtesy and kindness.—J. T. B.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The first ordinary monthly meeting of the Session was held in the Society's Hall on the evening of 18th December last, when Professor Robert K. Douglas read the paper we published last month on "Our Commercial relations with China. Dr. Dods presided.

On the following evening Professor Douglas repeated his lecture in Glasgow at a joint meeting of the Society's Branch and the Philosophical Society of Glasgow. Dr. George A. Turner presided.

A special meeting was held on 12th December in the Society's Hall, Edinburgh, to hear the paper by Captain A. C. Yate on "A Journey to Tashkent," which we publish this month. General Sir Robert M. Smith occupied the Chair.

GEOGRAPHICAL NOTES.

EUROPE.

Cyprus and Communication between Europe and India.—With reference to the paper on "A Railway through Southern Persia," published in our Magazine for December 1890, we have received a letter from Mr. C. J. Burnett, of Aberdeen, with numerous enclosures in support of his claim to the original suggestion that Cyprus should be occupied and held by Great Britain in order to facilitate railway communications with India. Mr. Burnett advanced this recommendation in a letter to the *Aberdeen Journal*, dated 2d February 1878, or four-and-a-half months before the lecture by Sir Frederic Goldsmid to the Royal United Service Institution, in which the latter suggested the "determination of Cyprus as an appropriate starting-point for a line of railway connecting the eastern shores of the Mediterranean with the western coast of India," etc. (*Scot. Geogr. Mag.*, vol. vi., p. 617). At, or about, the time Mr. Burnett's letter appeared, Sir Frederic Goldsmid was in Paris engaged on a public mission, and he has no recollection of having seen the copy of the *Aberdeen Journal* in question, nor of having received any communication addressed to himself on the subject. In any case it is of interest to note that the same idea should have occurred independently to both Sir Frederic Goldsmid and to Mr. Burnett.

Advance of Alpine Glaciers.—According to the latest observations which Dr. Finsterwalder has published in the *Mitteil. d. D. u. O. Alpenvereins* (1890, p. 265), the region occupied by advancing glaciers is extending from west to east, and has lately crossed the limits of the Eastern Alps. The glaciers in this region have been receding during the last thirty years, but now there is undeniable proof that those of the Ortler group, at any rate, are in a state of progression.

ASIA.

Central Asia.—M. Edouard Blanc, who was commissioned by the French Government to inspect the Trans-Caspian railway and inquire into the productions of Russian Turkistan, set out in October last, after accomplishing his task, with the intention of travelling to Kashgar. At Osh in Ferghana he met Captain Grombtchevsky on his return from Tibet. The latter, after leaving Polu (*vide* vol. v. p. 651), crossed the Kuen Lun Mountains by the extremely difficult pass, Lubashi, about 19,000 feet high, and reached the small lake of Gugurtlik, at which point he was obliged to retrace his steps.—*Compte Rendu* of the Paris Geog. Soc., No. 15, 1890.

The Irrawadi and Lake Indawgyi.—Major A. B. Fenton, Deputy Assistant Quartermaster-General for Intelligence in Burma, has published a diary of an ascent of the Irrawadi in May and June 1890. Leaving Bhamo on May 26th, in the steamer *Pathfinder*, under the command of Captain Barwick, he passed Maingna on June 6th, and the next day, ascending the Tángpe rapids with some difficulty, reached a point where the river divides into two branches. On approaching the bifurcation, the eastern branch, the Méka, lay right in front of the steamer. The other, the Malika, comes from the north, and is, near the juncture, 250 to 350 yards broad. It is enclosed by hills rising to a height of 500 to 600 feet. The party steamed up it for about an hour and a half to the foot of the Nawnaw (or Lawnaw) rapids. The Méka is 450 to 500 yards broad at the mouth, and, Major Fenton is inclined to think, is the more important branch. He was not able to ascend so far as on the Malika, owing to formidable rapids caused by mountain spurs descending into its bed at right angles. On the 12th of June the steamer had run down the Irrawadi to

Sinbo, and the next day it entered the Mogaung Chaung, reaching the town of Mogaung two days later. At Kamaing the Indaw Chaung enters the Mogaung, which above the junction is called the Namkong. This tributary, which is 100 yards wide at first and narrows down to barely 50, flows through a plain bounded to the north-east by mountains not exceeding 2000 feet in height. Near the lake the channel, though the country was flooded, was filled with water only waist-high. The Indaw Chaung is the only outlet of the lake, no connection existing, as has been stated, with the Chindwin, and in times of flood it pours its waters *into* the lake. Major Fenton adds in an appendix some short notes about the various tribes of Shans who inhabit the district of the Upper Irrawadi.

Touron in Annam.—The Bay of Touron is one of the finest in Annam. Encircled by a chain of serrated peaks it resembles a Swiss lake, but it is illumined by a more brilliant sun and begirt with forests of rich Tropical vegetation which entirely conceal from view the underlying granite. Its broad entrance opens between the island of Han, an advanced sentinel of the Aai Van Mountains, and the peninsula of Tien-cha. The small island of Mokoi, the beauty of which has been destroyed by the construction of warehouses and a landing-stage, is connected by a dilapidated jetty with the peninsula. The latter, formerly an island, is now joined to the mainland by an isthmus composed of two sand dunes protecting a small marshy plain, on which stand two small groups of dwellings amid rice fields. Not far from the isthmus the town of Touron is situated on both banks of a large stream. The town and its territory have recently passed into the possession of the French, and the commerce of the port is making rapid strides. In 1887 the value of the exports and imports was £220,000, the total commerce of Annam being £292,000, and this was when the country was still feeling the effects of a long and fierce war. The province of Kwang-nam, in which the town is situated, is in itself rich enough to give rise to considerable trade. Rice grows on the plains, tea at the foot of the mountains. Sugar is cultivated, indigo grows wild, and the cinnamon of the country is much esteemed by the Chinese. Nor are mineral riches wanting. Copper and zinc are worked, and 5000 tons of coal are annually extracted from the mines of Hong-son, two days' journey up the river. The flora of the country is varied and beautiful, and animals are numerous. Green parrots and kingfishers haunt the woods; geckos, large lizards, and pangolins are found among the rocks; and of large game there are deer and wild boars and large troops of monkeys. The hydrography of this province is simple. The rivers which descend from the mountains of Kwang-nam pour their waters into a lagoon sixty miles long, with three openings—one at Cape Hiep-hoa, another at Fai-fo, a port near the capital, Kwang-nam, and the third at Touron. Behind this lagoon lie fertile plains studded with farms. The mountains beyond rise gradually until they attain an elevation of not less than 6500 feet. The port of Fai-fo, already mentioned, is not accessible for vessels of large tonnage, and therefore the prosperity of the town, now containing 30,000 to 40,000 inhabitants, is probably destined to wane before the rising importance of its neighbour, Touron. The latter town is connected by telegraph with Tonkin and Cochin-China, and a road has been constructed to Hué.—*Bulletin de la Soc. de Géog. Commerciale du Havre, Mai-Juin* 1890.

Dutch Borneo.—Little is known of the interior of the island of Borneo, and, therefore, the information supplied by Heer S. W. Tromp in the *Tijdschrift van het Kon. Nederlandsch Aardrijkskundig Genoot.*, Deel vii. No. 4, though incomplete, is very acceptable. In 1885 he steamed up the Mahakam river to Muvara-Pahu, a village about 190 miles from the sea. Near the coast the land is flat, and is being laid out in rice-fields. It would also, in Heer Tromp's opinion, be suitable for the cultivation

of sugar-cane. Farther up the river, hilly country is entered, covered with a layer of yellowish red soil of little value for agriculture. After eight hours' steaming from Samarinda Heer Tromp passed the mouth of the Sebulu river, and 2½ hours later reached Naga-Beulur. Here the hills, which extend from Pelarang (a short distance below Samarinda) suddenly terminate, and the river emerges through a narrow channel from a level tract, stretching northwards probably to the frontier of Berau, which was formerly the bed of a large lake. Even now this depression is not entirely filled up. Meres and morasses of large area lie on either side of the Mahakam, and, when the water is high, that is, during the greater part of the year, a large proportion of the country is submerged. The district of the Upper Mahakam is inhabited by a tribe of Dyaks, known as Bahau-Dyaks in Kutei, and elsewhere as Pari-Dyaks. Their number is estimated at 4500. Formerly they were notorious head-hunters, and were much dreaded in the Baritu valley, but of late greater security has been established by the interference of the Sultan of Kutei.

The development of the country, however, has not been accelerated thereby, for, with the festivals held on the bringing home of heads, has also disappeared the stimulus to industry. Large sums were formerly expended in gala dresses for the women, of silk adorned with beads, and tobacco and rice were provided in abundance. Moreover, the Buginese dealers, as they have circulated more freely through the country, have introduced hazard and cock-fighting, with the most disastrous consequences. The steamer, in which Heer Tromp travelled, was unable to ascend the river beyond Muvara-Pahu, but he himself advanced some distance farther in a rowing boat. As far as Juhalang the river is easily navigable, but beyond the current is too strong, except when the water is abnormally low, and at Kapala-kiham a series of waterfalls practically limits the navigation.

Hence the difficulty of extending Dutch rule into Upper Kutei. Indeed, communication with Sarawak along the Seliku, one of the most important affluents of the Mahakam, which rises in the Batu-Tibang opposite the sources of one of the tributaries of the Batang-Rejang, seems to be more feasible than with the Lower Mahakam. It is also possible to reach the Upper Kayan by the Boh river, which enters the Mahakam above the first fall, but it necessitates a journey of eight days on the river and three over uneven and stony country to the highest navigable point of the Laya, a tributary of the Kayan. In the last-mentioned river an obstruction is said to exist even more formidable than the falls on the Mahakam. This remote country is inhabited by a number of Dyak tribes which, as well as the Bahau Dyaks of the Malakam, the Kenyas of the Upper Kayan, and others, had their home originally near the sources of Kayan. Since such insurmountable obstacles to communication exist on the routes already discussed, Heer Tromp turns his attention to the Kapuas river on the west. He passes over the lower course of the river up to Bunut with only a few cursory remarks, as it has been already described by Professor Veth in his *Borneo's Westerafdeeling*. The town of Bunut, at the mouth of a tributary of the same name, is the capital of the last Malayan kingdom.

Several affluents enter the main stream before the next town of any importance, Putus-Sibow, is reached. Here the Dyaks carry on a considerable trade with the Malay dealers, bartering the products of their forests against copper utensils, salt, tobacco, linen, crockery, etc. In 1888 Heer Tromp ascended this river, the Kapuas, in a steamer as far as the mouth of the Mendalam, a distance of 400 miles from the sea. It will be seen at once that it possesses a great advantage over the Mahakam, on which navigation is possible only for a distance of 250 miles.

Moreover, the Mendalam can be ascended by steamer, and Heer Tromp continued his journey in a boat up the Kapuas itself as far as Lunsa. Hajji Achmet, a native clerk, ascended the Bongan river, which enters the Kapuas at Lunsa, and its

affluent the Bulet to a point whence, he heard, the Seputan, a tributary of the Kaso, which flows into the Mahakam, could be reached in a day's march. This appears probable, for nowhere in this country are elevations of any great height to be seen. The Taman Dyaks, who dwell on the Upper Kapuas, are more civilised than the Bahaus or the Kayans. Their women wear tasteful sarongs ornamented with beads and shells, and do not tattoo themselves like the Kayan women.

AFRICA.

The country to the south of Lake Tsad.—The attention of those European nations which have a stake in the African continent is now directed towards that large and unexplored territory which lies between Lake Tsad and the M'bangi. Some nine expeditions, British, French, and German, are making for that region. It has long been known that the French entertain the idea of adding it to their possessions and of ultimately connecting Algeria with the French Congo. The German colonial journals, again, relying on the *Hinterland* theory, protest that the authority of their Government ought not to be bounded by the 15th meridian, and assert that it may justly raise claims to regions explored almost exclusively by German travellers—Barth, Vogel, Nachtigal, Flegel, and others of less note.

Lake N'gami.—In January 1890 Captain von François set out on an expedition to this lake. The route from the Coast led over level ground and presented no difficulties, except that of keeping the baggage animals alive, for even in the rainy season water is scarce. The country is very sparsely inhabited. In the Nosob valley dwell Amraal Hottentots, and Bechuana in the Swas valley, and between these places are found wandering Bushmen and a dwarf race in a very low state of culture similar to Bushmen. At the end of March Captain von François returned to Rehoboth, and prepared to travel in Eastern Damara-land.—*Verhand. der Gesell. für Erdkunde zu Berlin*, Bd. xvii. No. 7.

AUSTRALASIA AND POLYNESIA.

Map of the Kei Islands.—In letters published in the *Tijd. van het Kon. Nederl. Aadrijkskundig Genoot.*, Deel vii., No. 4, Heer H. O. W. Planten announces that he has completed his survey of these islands, with the exception of Kur, which lies so far from the rest of the group that it can hardly be said to belong to it. He has, however, taken its bearings. He was unable to penetrate far into the interior of Great Kei owing to its dense forests, but he determined the positions of the mountains and their heights. Owing to the sudden squalls which prevail on the coast, only a limited number of soundings could be taken. At a distance of 400 to 500 yards from the shore the depth was more than 50 fathoms. In the middle of 1890 Heer Planten was at work in the Tiando group.

The Rainfall of Samoa.—Dr. Funk has kept records of the rainfall, during the years 1882 to 1888 inclusive, at the coffee plantation, Utumapu, in the island of Upolu. This place lies on the northern slope of the backbone of the island, at an elevation of about 850 feet above the sea, and is distant about 3 nautical miles from the coast. The average rainfall during the years mentioned was 135·12 in., and the average number of rainy days 192·8. The months in which most rain falls are December, January, February, and March, the monthly maximum, 24·88 inches occurring in January. During these months rain fell on 84·8 days to the total depth of 73·16 inches, while during the driest months, May, June, July, and August only 22·79 inches fell on 43·6 days. The maximum rainfall recorded in a

single month was 40·66 in., in March 1882. Though there is a considerable difference in the quantities of rain which fall in the dry and wet seasons, the climate of Samoa is always more or less humid. During the period of observation there was not a single month in which no rain fell. The driest month, August 1888, had five rainy days, with a fall of ·86 inch. In the *Annalen der Hydrographie*, Heft v., 1890, from which these data are taken, a table is given showing the rainfall also on the New Caledonian, Fiji, and Society Islands, from which it appears that the wet and dry seasons are the same in all, but that much more rain falls on the Samoa Islands than on the other groups.

GENERAL.

Lands of the Globe available for European Settlement.—With reference to the paper on the above subject read by Mr. E. Ravenstein at the last meeting of the British Association, a report of which was given in the Magazine (vol. vi., p. 541), we extract from the Proceedings, R. G. S., for January 1891, the following tables :—

THE WORLD'S POPULATION IN 1890.

	Population.	Average to a Sq. Mile.	Increase per Decade. Per Cent.
Europe, . .	380,200,000	101	8·7
Asia, . .	850,000,000	57	6
Africa, . .	127,000,000	11	10
Australasia, .	4,730,000	1·4	30
North America, .	89,250,000	14	20
South America, .	36,420,000	5	15
	1,487,600,000 [1]	31	8

CULTIVABLE AREA OF THE GLOBE (in square miles).

	Fertile Region.	Steppe.	Desert.	Total.[2]
Europe, ...	2,888,000	667,000	...	3,555,000
Asia, ...	9,280,000	4,230,000	1,200,000	14,710,000
Africa, ...	5,760,000	3,528,000	2,226,000	11,514,000
Australasia, . . .	1,167,000	1,507,000	614,000	3,288,000
North America, . .	4,946,000	1,405,000	95,000	6,446,000
South America, . .	4,228,000	2,564,000	45,000	6,837,009
Total, . .	28,269,000	13,901,000	4,180,000	46,350,000

Spitzbergen.—An account of the expedition announced in vol. vi. p. 388 has been contributed to the *Compte Rendu*, No. 14, 1890, of the Paris Geographical Society by Professor Nordenskiöld. Besides the chief of the expedition, M. Gustave Nordenskiöld, son of the Professor, Baron Axel Klinkowström (geologist) and M. J. A. Björling (naturalist) embarked at Tromsö on the *Lofoten*, and, after an unsuccessful attempt to land on Bear Island, sighted the southern cape of Spitzbergen on May 13th, and arrived at Horn Sound on the 15th. Here Nordenskiöld and Björling left the ship, and crossed on snow-shoes the extensive glaciers between this sound and Recherche Bay. One of the objects of

[1] Exclusive of 300,000 in Polar Regions.
[2] Exclusive of the Polar Regions (4,888,800 sq. miles).

the expedition was to ascertain the possibility of measuring a meridional arc from the Seven Isles to the South Cape, and the explorers were pleased to find that these glaciers present no obstacle to such an undertaking, for though they ascend nearly to the summits of a chain of mountains 2300 feet high, they are free from crevasses and easy to traverse. Finding at Recherche Bay that it was too late in the season for geological investigations, the party sailed to Ice Fiord, the neighbourhood of which, as also the peninsula lying between Ice Fiord and Bel Sound, is one of the most interesting regions of the globe, owing to the numerous and magnificent glaciers which here descend into the sea and the grand outlines of the mountains. Deep layers of fossil plants of different ages bear evidence that this country was formerly clothed with a vegetation rivalling the flora of the most favoured parts of the Temperate zone. Rich collections brought home by former explorers have been described by M. Oswald Heer and M. A. G. Nathorst. These fossil plants are found, not only at the sea-level, but also in the strata forming the summit of one of the highest mountains, about 3660 feet, lying between Ice Fiord and Bel Sound, to which M. Nathorst gave the name of Nordenskiöld. These strata having been examined but very superficially, it was the task of the expedition to fill up this gap in the geological record of the country. It was found that the elevated plateaus are paved with schists and argillaceous marl which contains impressions of Tertiary plants in an excellent state of preservation. A fine collection was brought home and deposited in the Academy of Sciences. On August 13th the vessel left Ice Fiord and sailed up the west coast to Cloven Cliff, not far from the 80th parallel. Between latitudes 79° and 80° the slopes of snow were coloured red, but whether this effect is produced by the same species of small alga as grows in Switzerland and Greenland has not been ascertained. The expedition continued northwards as far as lat. 80° 45′, took photographs of the glaciers at Red Bay and Recherche Bay, and returned to Tromsö on September 17th.

Effect of Snow on the Temperature of the Ground.—Interesting observations have been made at the observatory of Katherinenburg. In the winter of 1886-7 it was found that the temperature of the ground at a depth of 14 inches was warmer when covered with snow by more than 10° Fahr. in January, and at a depth of 31 inches in March, while in April it was 6° warmer at a depth of 63 inches. In the following winter the cold in the four coldest months was more severe than in 1886-7, the thermometer falling 5° lower, but the temperature of the ground at a depth of 14 inches was 7° higher. Where, however, the surface of the ground was unprotected by snow the cold penetrated downwards very quickly. In countries, such as Siberia and Canada, where the snow lies for a long time, the mean temperature of the ground is 9° F., and in some parts even more than 18° warmer, under a covering of snow.—*Verhand. der Gesell. für Erdkunde zu Berlin*, Bd. xvii. Nos. 8 and 9.

Luminous Clouds.—In *Nature*, November 20th, Mr. O. Jesse gives the result of observations of luminous clouds in the neighbourhood of Berlin. In June 1885, he noticed them at Steglitz, at about 9.50 P.M., local time. "The north-western and northern sky was covered, to the height of about 20°, with a layer of bright cirrus-like clouds, which reached from about NW. to NNE. The lower zone was without lustre, and had a yellowish appearance ; higher up there was a strip, several degrees in breadth, which shone with an extremely beautiful, white-gleaming, silver-like light ; above this strip was another like it, but not quite so brilliant, of a bluish tint. The light of the central zone was comparable to the light of the nearly full moon, when it stands at sunset at about 10°, more over the eastern

horizon." This phenomenon recurred several times during the following weeks, but disappeared towards the end of July. The time of appearance was, as a rule, fifteen to twenty minutes, but sometimes forty minutes, after sunset. In December and January luminous clouds appear in the southern Hemisphere, from about 48° to 60°, but no information has been received with regard to their appearance near the Equator. Seeing that their height diminishes as the sun sinks, they must be attributed to direct illumination from the sun, and, on this assumption, Mr. Jesse calculated their distance from the surface of the earth as 50 to 60 kilomètres (31 to 37 miles). In 1887, by means of photographs, taken simultaneously at different stations, he determined the height on three occasions to be 75, 81, and 82 kilomètres (47, 50, and 51 miles) respectively. The observations have established the fact that these clouds have in general a very rapid movement from north-east to south-west, though occasionally they move, much more slowly, in the opposite direction. Since first noticed they have considerably waned. In 1890 they displayed their full brilliancy on three nights only—their altitude being at the same time much less than in former years. They have also appeared less frequently before midnight, at which time they are more highly luminous.

Oceanic Circulation.—*Le Globe*, 5ème série, Tome 1er, contains a mémoire by M. Emile Chaix on this subject. The author describes the methods adopted to ascertain the existence and velocities of currents, and enunciates the theories that have been propounded, both in ancient and modern times, to elucidate the process of oceanic circulation. Finally, he states the causes most generally accepted at the present day to be : (1) differences of density, particularly those due to temperature, which, owing to the action of gravity, produce a slow progression of the waters of the Polar seas towards the Equator, this motion being confined to the depths of the ocean ; (2) the prevailing winds, which cause perceptible currents on the surface and, after long continuance, make their influence felt to a certain depth below the surface ; and (3) a movement of compensation to which may in general be attributed the residuary phenomena not accounted for by the direct action of the wind, and which gives the key to a host of apparent anomalies.

MISCELLANEOUS.

In the *Revue de Géographie* (October and November 1890), a list of books, pamphlets, and articles relating to **Senegambia and the French Sudan** is now being published.

A *résumé* by Professor Ratzel of the **Scientific results of Mr. Stanley's Expedition** will be found in *Petermann's Mitt.*, Bd. xxxvi. No. 11. It is divided into three chapters on the configuration of the country, the snows and glaciers of the mountains, and the hydrography of the region traversed, respectively.

Sir Thomas Elder has provided the funds for another **Expedition into the Interior of Australia**. Its destination is the country to the north and north-west of Lake Amadeus, where extensive pasture lands are supposed to exist. This is the fourth exploring party that Sir T. Elder has equipped.—*Petermann's Mitt.*, Bd. xxxvi. No. 11.

In the *Revue de Géographie*, October and November 1890, M. Léon Vignols has given a short historical narrative of the enterprises of **France in Madagascar** during the period from 1674 to 1750. He concludes that France during this interval never abandoned her claims on this island, but, on the contrary, maintained regular communication with it and endeavoured to develop the country.

Petermann's Mitt., Bd. xxxvi. No. 11, gives the following results of **Professor Heilprin's Measurements in Mexico** :—Peak of Orizaba, or Citlaltepetl, 18,205 feet (17,876) ; Popocatepetl, 17,523 (17,778) ; Iztaccihuatl, 16,960 (16,744) ; Nevado de Toluca, 19,454 (14,990). The figures in brackets indicate the heights given by former measurements. The town of Mexico, as shown by the levellings made for the railway, lies 123 feet below the elevation, 7470 feet, deduced from former surveys.

The Commission for the delimitation of the boundary between the **British Territory and Alaska**, under the leadership of J. H. Turner, has encamped on the Porcupine River. It has been ascertained that the station, Rampart House, supposed hitherto to stand on British soil, lies 20 miles to the west of the 141st meridian, which marks the frontier in that region.—*Petermann's Mitt.*, xxxvi. 11.

M. de Brettes, whose journey in the Chaco has been noticed in the *Magazine*, is about to set out for Grand Bassam, with the object of making an expedition to **Barua on Lake Tsad** by way of Kong, Say on the Upper Niger, Sokoto, and Zinder. The aim of the expedition is to open fresh avenues for trade in the region lately placed under French protection by the Anglo-French Treaty.—*Revue de Géographie*, November 1890.

Messrs. Russell and Kerr (*vide* vol. vi., p. 497) have ascertained that **Mt. Elias** undoubtedly stands in the territory of the United States. Their measurements show that it is not the highest summit of North America, an honour which belongs to Mt. Wrangel. The following figures are taken from *Petermann's Mitt.*, Bd. xxxvi. No. 11, those in brackets being the measurements of former travellers. Mt. Elias 13,500 feet (19,500) ; Mt. Cook 10,250 (16,000) ; Mt. Vancouver, 9,400 (13,100).

The Karl Ritter Stiftung intends to equip an **Expedition to the West Coast of Greenland.** Dr. E. von Drygalski is to be the leader, and Herr O. Baschin will accompany him at his own expense. The head of the Umanak Fjord, 70° 30′ N. lat., has been chosen for the site of a station, where Herr Baschin will carry out a series of meteorological observations, while Dr. von Drygalski makes excursions to investigate the conditions of the ice, the movement of the glaciers, etc., with the assistance of a third scientist yet to be chosen. The expedition will set out in the spring of 1891, and will remain twelve months at the fjord.— *Deutsche Geograph. Blätter*, Bd. xiii. Heft 4.

NEW BOOKS.

Across East African Glaciers. An Account of the First Ascent of Kilimanjaro. By Dr. Hans Meyer. Translated from the German by E. H. S. Calder. With 40 Illustrations and 3 Maps. London : George Philip and Son, 1891. Pp. 397. *Price* 32*s*.

This handsome volume of travel is a worthy and permanent record of Dr. Hans Meyer's successful feat. He and his companion, Herr Purtscheller, spent from twelve to sixteen days between the altitudes of 15,000 and 20,000 ft., during which time they made four ascents of Kibo and three of Mawenzé (the twin-peaks of Kilima-njaro), "reached the culminating peak of the mountain (Kibo), ascertained the existence of a great crater at the summit, discovered the first African glaciers, and made a tolerably thorough survey of the higher altitudes." Such a result, after a former failure on Dr. Meyer's part, was in the highest degree satisfactory.

The greater part of the book is concerned with the wearisome recapitulation of the long-familiar caravan experiences between the Zanzibar Coast and Kilima-njaro. We suppose this record was inevitable, but Dr. Meyer might have spared us some of the details. In the introductory chapter we have an account of "Kilima-njaro in the Past," in the course of which the author passes some severe strictures on some of his predecessors in the field of exploration. Passing over the events of the march to and from his goal, the most interesting incidents of the expedition were, of course, those experienced in the plucky ascent of the mountain. In the last chapter—which is the most valuable of all—Dr. Meyer gives an admirable summary of the physical geography of the Kilima-njaro region and its commercial prospects. As he was the first explorer of the higher altitudes, we learn much that is new to us. During the short time he was there he accomplished a great deal of excellent topographical work, and his observations are valuable.

There are, however, one or two points on which Dr. Meyer appears to speak without sufficient forethought or consideration. The behaviour of the clouds, for instance, was, according to Dr. Meyer, somewhat erratic. He speaks frequently of the "upper trade winds," when presumably he means the Equatorial return-current, and he does not take into sufficient account the local influence which such an immense mountain-mass as Kilima-njaro cannot fail to exercise on the movements of the atmosphere—that is to say, if his descriptions apply to the higher strata. He persists throughout the book in calling the snow-cap the "ice-cap,"—a term which is scarcely permissible in the sense in which he mostly applies it. Other expressions, of which "the lee of the wind" is the worst example (p. 307), may be the fault of the translator, who, however, has done Dr. Meyer excellent justice on the whole, and has produced a very readable translation. Dr. Meyer's comments on the commercial prospects in Eastern Equatorial Africa are worthy of attention, though too pessimistic in tone. He gives a well-merited rebuke to those enthusiasts who have misled the public by describing the region as a "second India." But surely he is very far from uttering words of wisdom when he says:—"Instead of wasting time and money in trying to open up the interior by railways and other unsuitable means, let us confine our operations to the coast, and leave the natives to bring their produce to us in their own time-honoured fashion" (p. 340). This is the conclusion to which Dr. Meyer arrives, but we fear it is a very hasty one. It is, in fact, no new policy which he advocates, but that which has regulated the relations between Europeans and Africa for over 300 years! Nothing further need be said to argue its absurdity. At the same time, it is only fair to Dr. Meyer to add that he is in favour of Europeans occupying the healthier upland or mountain regions in proximity to the coasts.

The maps and illustrations to the book are perfect in their way, and greatly add to its attractiveness. A valuable set of appendices discuss the scientific collections and observations of the expedition, whilst a useful bibliography is given of the literature dealing more especially with the Kilima-njaro region.

A word of praise is due to the publishers for the beautiful and artistic appearance of the volume.

Modern Discoveries on the Site of Ancient Ephesus. By the late J. T. Wood, F.S.A. ("By-Paths of Bible Knowledge," xiv.) London: Religious Tract Society. 1890.

This small volume is condensed from the late Mr. Wood's larger work published in 1877 on his *Discoveries at Ephesus*. It falls naturally into four divisions:—(1) The Historical Sketch of Ephesus, forming the introductory chapter; (2) The

Site and History (with anecdotes and incidents) of the explorations in search of the Temple of Diana, which occupied Mr. Wood from 1863 to 1874, and cost £16,000, provided by the British Museum, of which £12,000 was spent on clearing out the Temple site; (3) The Description of the Temple according to Mr. Wood's theories; and (4) The Christian Antiquities of Ephesus, in the sixth chapter, occupying about 9 pages. The first two and last of these divisions form interesting popular reading, and the editor or condenser has done his work well, giving the reader a clear and popular rendering of the original work, beyond which there was little temptation to travel. The description of the famous Temple, however, is the portion that will attract the readers to whom the volumes of the series are specially addressed, and unless they can control Mr. Wood's theories by wider knowledge, they will be misled. He assumes (p. 70) that Pliny's dimension of the width of the Temple—220 feet—is quite incorrect, that Pliny speaks of only 100 columns, of which 36 were sculptured, and (p. 76) that he says only 27 were the gifts of princes. Now Pliny's words are: "Universo templo longitudo est ccccxxv pedum latitudo ducentorum viginti columnæ centum viginti septem a singulis regibus factæ lx pedem altitudine ex iis xxxvi cælatæ una a Scopa." Reading this, even without the modern punctuation, it seems hardly possible to suppose that Pliny meant the *viginti septem* to be disjoined from the *centum*. It is an illustration, however, of how a text may be twisted to support a preconceived hypothesis, that Mr. Wood makes this to mean there were 100 columns in all, of which 27 were each the gift of a king. The author of this *résumé* does not hint at the usual reading of Pliny's text, much less refer to the restoration of the original, from Mr. Wood's own data and in exact accordance with Pliny's text, by the late James Fergusson (*Transactions R. I. Brit. Archit.*, 1877 and 1883), in which he shows that the length and breadth of the stylobate of the Temple were 425 and 220 Greek feet respectively, and the columns 127—just as Pliny says—while other features of his restoration seem superior in probability and taste to those of Mr. Wood. In works of this sort it is surely desirable that the whole state of a question as it stands should be stated, and not the mere *ex parte* assertion of a single theorist, however eminent, without a hint as to serious divergencies, either from evidences or from the opinions of other qualified scientists.

With the Beduins: A Narrative of Journeys and Adventures in Unfrequented Parts of Syria. By GRAY HALL. London: T. Fisher Unwin. 1891.

The author, accompanied by his wife, made three separate journeys through Syria. They were fortunate in getting the same dragoman to accompany them on each occasion, and he seems to have proved a most valuable assistant in their explorations. They visited the ruins of Palmyra in 1889, a journey which is never free from danger from the predatory tribes who roam about that region. The Governor of Damascus refused them an escort of soldiers, but as they were determined to go they made an arrangement with a Beduin Sheik to accompany them as guide and protector. They were the first Europeans to see the stream of fresh water which has been discovered among the ruins of Palmyra. It runs in a channel of stone, a few feet under the surface of the ground. This is a most important discovery, as hitherto travellers had to bring a supply of drinking water on camels. The Arabs are now searching for other supplies of water, with some prospect of success, as it is reasonable to suppose that a great city like "Tadmor in the Wilderness" could not have existed without a good supply of water. The travellers also saw a fine piece of sculpture which had just been unearthed, and

luckily saved from mutilation, by the prompt action of the Governor. The account of the wanderings of the author and his wife are of great interest. Their captivity in the village of a fierce tribe of Beduins, where they were held to ransom, must have been anything but a pleasant experience, and is certainly a warning to any future travellers in that region. The book is beautifully illustrated from photographs taken on the spot. The portrait of the son of Sheik Saleh in the frontispiece is the likeness of as thorough a scoundrel as any one could wish to see.

Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien. Herausgegeben von Dr. Max Weber, Professor der Zoologie in Amsterdam. Erstes Heft. Mit 3 Karten, 13 Tafeln, und 4 Zincographien. Leiden, 1890. E. J. Brill. Pp. 158 + xii.

The editor of this work travelled in the Dutch East Indies between March 1888 and April 1889, his principal objects being to investigate the fresh-water fauna, to study more particularly the mammals, and to acquire knowledge respecting the land invertebrates. The islands visited were Java, Sumatra, South Celebes, Flores, and Saleijer. The volume contains an introduction by the editor; papers in German on "Themnocephala Blanchard," and the "Spongillidæ of the Indian Archipelago," both by Dr. Weber; a paper on the "Apterygota" of the same region, by Oudemans: and one on the "Land Planaria of the larger Sunda Islands," by Loman; two papers in English on the "Mammalia," by Dr. Weber and Jetink, respectively; and one in French on "Some New Instances of Symbiosis," by Dr. Weber and his wife.

Le Paraguay. Par Le Docteur E. De Bourgade La Dardye. Paris: Plon, Nourrit et Cie., 1889.

Some twenty years have now elapsed since the unprincipled ambition of the younger Lopez brought the disastrous war upon Paraguay which ended in its devastation and the destruction of the greater part of its population. It has since then, under prudent government, aided by supplies of capital procured chiefly from England, been gradually regaining some measure of the prosperity which it enjoyed under the dictatorships of Dr. Francia and the elder Lopez. It is a country to which but little attention has hitherto been directed, owing mainly to its being hidden far away in the very heart of a vast continent, in which it appears like the outpost station between the known world and solitude. Paraguay is, however, a very interesting land, alike from its history, its natural characteristics, and the very great variety and value of its products. The Jesuits, perceiving the many advantages offered by its geographical position, its good climate, and its fertile soil, made choice of it for the establishment of their celebrated *reductions*. It is admirably described in the work before us. Dr. de Bourgade writes with full knowledge of his subject, having spent two years in Paraguay, during which, besides exploring some of its less frequented parts, he carefully examined its political, social, and economic conditions. The information thus collected he sets before his readers in a narrative possessed of all the lucidity and grace which characterise French writings. He treats his subject under three heads—Nature, Society, and Labour. Under the first, besides other matters, he discusses in great detail the geography of the country. He claims to be the first writer who communicates exact notions regarding the interior parts, into which no European has as yet been able to penetrate to the same extent as himself. In the valuable map which accompanies his work he has rectified, he says, numerous errors commonly to be found in modern geographies, and he points out that in all existing atlases

the real boundaries are most inaccurately traced—some parts of the country being still very imperfectly known, such as the valleys of the Upper Paraná, of the Aquidapan and of the Ipané. On the other hand, the author has been able to describe with great care and precision the valleys of Jejuy, of the Tibicuary, and of the Apa, the sierras of Amambay and of Mabaracayu, and the course of the Upper and the Middle Paraná.

The republic of Paraguay has two main divisions—Eastern and Western Paraguay. The latter, which is called the Chaco, was claimed at one time by Bolivia, but was awarded to Paraguay by a decision of the American President of the day, to whom the dispute was referred for arbitration. The two divisions differ widely in their physical features. In Paraguay proper, which is enclosed between the two vast rivers, the Paraguay and the Paraná, the predominant feature is the virgin forest with its majestic trees, its entangled climbing plants, and its brilliantly tinted flowers. At intervals occur vast stretches of pasture lands, swelling occasionally into hills which are covered with coco-palms. The scenery is further diversified with plantations of orange trees always in bearing, with the clustering stems of the banana, and with a kind of leguminous plant, which in spring-time is adorned at the top with a bright violet crown. The Chaco, on the other hand, consists for the most part of bare and marshy land, where there is little to relieve the dull monotony of the outlook, except an occasional mass of rock or an eminence covered with thick forests of *quebracho*, a tree of the Terebinth order. This division is confined to the western side of the river Paraguay, but extends nearly two degrees farther northwards than the other division. The population is settled chiefly along the banks of the Paraguay. Its amount has been variously estimated, but Dr. de Bourgade, after a very searching inquiry, sets it down at half-a-million, of whom 34,072 are located in Asuncion the capital, of which a census was taken in 1887. The country is very inadequately supplied with roads, but the rivers help to supply the deficiency of the means of transport. There is but one line of railway, that which connects the capital with Encarnacion. It is in contemplation to construct a line between the capital and Santos, on the Atlantic coast. Were this completed and immigrants introduced into the country, to develop its vast resources, a great future, it may safely be predicted, would lie before Paraguay. We trust Dr. de Bourgade's excellent work will soon reappear in an English translation.

Face to Face with the Mexicans: The Domestic Life, Educational, Social and Business Ways, Statesmanship and Literature, Legendary and General History of the Mexican People, as seen and studied by an American Woman, during seven years of intercourse with them. By Fanny Chambers Gooch. With 200 Illustrations. London: Sampson Low, Marston, Searle, and Rivington. Pp. 584.

The favourable reception of this book in America, and the high encomiums bestowed upon it by the leading journals and periodicals, testify to its merit and its accurate and trustworthy information on things relating to Mexico and its people. The writer was one of a party of Americans on "business, health, and pleasure bent." They took a house in Saltillo, a town of 20,000 inhabitants, situated at a height of 5500 feet on the Sierra Madre mountains. Then began the perpetual worries and comical catastrophes incident to housekeeping in a strange country, where the principal actors have a very limited knowledge of each other's language. The laziness, untruthfulness, and general incapacity of the servants, were either quite unsuspected, or taken with that wonderful good-humour which seems to be a peculiar characteristic of Americans in their dealings with domestics. The habits and customs of the lower classes are fully described, and we have

some charming pictures of home life in the higher ranks. The journey along the Mexican Central Railroad, the description of the city of Mexico, and various legends and histories concerning the Aztecs, the visit to Morelia and other cities, are all very interesting. The book is handsomely got up, and is embellished with excellent illustrations.

The Marvellous Country; or Three Years in Arizona and New Mexico. By S. W. Cozzens. New and Cheaper Edition. London: Sampson Low, Marston, Searle, and Rivington, Limited. 1890. Pp. iv + 310. *Price* 2*s.* 6*d.*

In drawing attention to this new and cheap edition of a work that has already made a place for itself in the good graces of numberless boys, it may be enough to say that the narrative is of sustained interest, full of adventures, and with much information about the scenery, mineral wealth and antiquities of the country, and the disposition, manners, and customs of the Indians of Arizona and New Mexico. The book is clearly printed, and the illustrations, if not produced in the highest style of art, are numerous and spirited.

The Graphic History of the British Empire, from Celtic Times to the Present Day. Illustrated with Maps, Plans, and Tables. London, Edinburgh, and New York. T. Nelson and Sons. 1890. Pp. xii + 803. *Price* 6*s.* 6*d.*

It may well be questioned whether there be room for a publication of this kind; but there can be no doubt that the manner of its compilation and the plan of the whole work are fresh and attractive, and ought to go far towards securing it a place among the numerous books of the same class. The view of British history taken by the author is that which may be called the orthodox, from the frequency with which it has been adopted, and which, largely from the same cause, is that most popular with the public. The way in which the narrative has been broken up into periods, not depending upon reigns and dynasties but upon events and upon the lives of epoch-making men, is to be commended, as a clearer view of events is frequently afforded than is always the case where the older method is employed. The inset maps are a capital feature, although they might have been better printed in some instances, and have contained more names in others. For instance, the map of parts of Spain and Portugal on p. 665 shows Fuentes d'Onoro as in Spain. Villa Formosa, where the first day's fighting took place, is in Spain, but the village from which the battle was named is in Portugal, and, in the same map, the name of Almeida is absent, although the attempted relief of that town was the object of the engagement referred to. Although we are of opinion that the true views of events, with their causes and consequences, have not invariably been taken, yet we are constrained to say that in spite of that and several other slighter blemishes, such as those already pointed out, the volume is a thoroughly good one, very brightly written, and calculated to arouse interest and a spirit of investigation in the young. It is clearly printed on good paper, and handsomely bound. The numerous tables, and, above all, the abundant and singularly apt notes are features to be strongly commended. The index also is ample, and there is a valuable appendix, dealing mainly with the political geography of the Empire.

A Short History of Newfoundland; England's Oldest Colony. By Rev. M. Harvey. F.R.G.S. Second Edition, Revised and Enlarged. With Coloured Map. London and Glasgow: William Collins, Sons, and Co. Limited, 1890. Pp. viii + 188.

That a second edition of this simply told history has been called for would seem to indicate that some little interest is being taken in the mother country concerning

our oldest and most neglected colony. If this view be the correct one, it ought to be a cause of congratulation, for, should the attention of the public be once clearly directed to the trials and disadvantages suffered by the inhabitants in time past, and the drawbacks which still prevent colonisation and settlement from freely proceeding, there can be little doubt that the "tinkering" policy pursued by the Home Government for so many generations would be soon discarded. The Fishery question with France, for instance, is continually cropping up, and as continually temporarily settled, only to break out again. Full particulars on this and on various other matters, are given by Mr. Harvey, who makes a good use of not very promising materials—for it cannot be denied that there is much less of romance in the history of Newfoundland than in that of most of our colonies.

Applied Geography: A Preliminary Sketch. By J. Scott Keltie. London: George Philip and Son, 1890. Pp. 169. 11 Maps and Diagrams. *Price* 3*s.* 6*d.*

"This is not a text-book of commercial geography," explains the author in the first line of his preface. It is not a text-book, inasmuch as it is small in size and deals with few facts; but it is a book of value, being great in scope, philosophical in treatment, and going far to define the somewhat vague field of Geography. The department of commercial geography, with which four of Mr. Keltie's suggestive chapters deal, is viewed from the standpoint with which readers of this *Magazine* have become familiar. No such lucid discussion as this volume presents has previously been placed before the public, and both teachers and students of geography will find fresh ideas and suggestive hints in its pages. The first chapter has already appeared, under the title "Applied Geography," in the *Contemporary Review,* and is highly welcome in its more permanent form. The remaining four chapters were originally given as lectures to the Bankers' Institute and other public bodies in London. They deal with (1) Geography applied to Commerce; (2) The Geography of Africa in its Bearings on the Development of the Continent; (3) The British Empire; and (4) Some common commodities.

The first two chapters are far before the others in literary merit; but the selection of facts in all is judicious, and the inferences drawn are cautious and comprehensive. The account of the geography of Africa is a valuable epitome, and six remarkably clear little maps by Mr. Ravenstein add to its interest. The maps are not faultless in colouring, nor are they the maps referred to in the text, a fact which tends to confuse the reader. The only other fault we have to find is the author's use of "England" instead of "United Kingdom." This is a slip so common in literary and political writings as to be scarcely worthy of remark; but in geography it is surely a first principle that places be called by their own names, and that the same names be not used for different places or groups of places.

Mr. Keltie's position of recognised authority, and his exceptional command of the latest facts and statistics, justify our hope that his little book will show the mercantile and educational public of this country what geography really is, and how geography can be applied to the concerns of daily life.

Commercial Instruction: The Golden Gates of Trade with our Home Industries. Introductory to a study of Mercantile Economy and the Science of Commerce. By John Yeats, LL.D., F.G.S., F.S.S., etc. London: George Philip and Son, 1890. Pp. 354. *Price* 4*s.* 6*d.*

Map Studies of the Mercantile World. Auxiliary to our Foreign and Colonial Trade, and illustrative of part of the Science of Commerce. Pp. 336. Same author, publishers, and price.

Dr. Yeats is the veteran pioneer of commercial geography in this country, and

none is better entitled than he to take part in the stream of literature which now irrigates the field where he so long toiled alone. These two volumes condense in a very advantageous manner the substance of the author's more voluminous treatises and laborious, life-long researches. The *Golden Gates* gives a minutely classified and well-indexed account of the industries of the United Kingdom, and the chief markets and fields of supply in the world. *Map Studies* is a misnomer. The preface refers to "the map," certainly; but the reference is to a glorified map, such as no publisher can produce. There is no word as to scale, projection, or mode of representing surface features, no maps are given, and in the text maps are seldom referred to. The book is merely a condensed "commercial geography" of the chief countries of the world. The mass of facts brought into small bulk is the most noticeable and the most valuable feature of both books. The prefaces and introductions are excellent in their way, though a little diffuse and overburdened with quotations.

The Romance of Science Series: The Birth and Growth of Worlds. A Lecture. By A. H. Green, M.A., F.R.S., Professor of Geology in the University of Oxford. London: Society for Promoting Christian Knowledge, 1890. *Price* 1*s.*

The object of Professor Green's lecture is to give a popular account of the most recent theories of world-production. The nebular hypothesis, the protyle theory of Mr. Crookes, the meteorite theory of Mr. Lockyer, are successively explained. As a preliminary step Mr. Green reviews briefly the cosmogonies of the pre-scientific period, particularly that of Dr. Thomas Burnet. The treatment, as we have said, is popular, but it is at the same time lucid and accurate.

Science Ladders. London: George Philip and Son, 1890.—*Price* 1*s. each Volume.*

1. The Life-Story of our Earth.
2. The Story of Early Man. With Illustrations and Maps. By N. D'Anvers.

The little books called "Science Ladders" aim at teaching young persons the elements of natural science in the simplest possible language. "The Life Story of our Earth" is really an elementary treatise on palæontology. "The Story of Early Man" is a sequel to it, and treats in the same way of prehistoric man. The author's aim is a commendable one, but his success is doubtful. He professes to use "language simple enough to be understood by every child who can read;" yet he opens one of his chapters thus:—

"To the great epoch which succeeded the Palæozoic two names have been given: the Mezozoic, or the age of middle life, and the age of Great Reptiles. It has been divided into three parts, the Triassic, the Jurassic, and the Cretaceous." There are many children "who can read" to whom this will be as easy as Greek. The truth is that there is only a certain length to which the simplification of the language of science can be carried, and that limit does not include technical terms.

A Popular Handbook and Atlas of Astronomy; Designed as a Complete Guide to a Knowledge of the Heavenly Bodies; and as an aid to those possessing Telescopes. By William Peck, F.R.S.E., F.R.A.S., Astronomer to the City of Edinburgh, etc. London: Gall and Inglis, 1890. *Price* 21*s.*

This is a very handsome demy-quarto volume of 176 pages, exclusive of the plates and charts, which, according to the title-page, number 44, according to the preface 45, and according to the contents 43; but possibly the last, which is a double-page plate, is to be reckoned as two. The paper is thick and excellent, and

the type good. The plates are supplemented by over forty wood-cuts inserted in the text, and are all exceedingly clear and well executed—a most commendable feature in a work of the kind. Most of these illustrations have been constructed by the author himself, and must have involved much painstaking labour, and they make the text readily intelligible.

As a popular handbook we know of no other of the kind generally superior to it—the abundance of charts and diagrams showing very clearly the arrangement of the constellations, the telescopic appearances of the moon, planets, clusters, nebulæ, and comets, and the whole supplying that information and guidance which a beginner in the study of the heavens most requires.

The first chapter presents the author's opinions as to the origin of the constellations, which is certainly new; but it is hardly fitting pabulum for a beginner in Astronomy, since Mr. Peck's theory is that the older constellations, such as Ophiuchus, Hercules, Cassiopeia, etc., were laid down by the Egyptians about 13,000 B.C. There is no better evidence for this than there was for another astronomer's theory, that the Great Pyramid was built as a record of a divinely inspired system of standard measures. It is not science, and had better have been omitted.

There are a few misprints, such as 'Tchcon-Kong' (p. 47); 'Lacialle' (p. 47, *conf.* p. 113); the obliquity of the ecliptic as determined by Ulugh Beg, A.D. 1437, is given as 20° 30′ (p. 93) instead of 23° 30′, etc.; in the index for the 'parallax of the moon' we are referred to page 74, where it is not named, but it is given in the table on page 80, which begins with a repetition from page 73 of the various periods of the moon's revolutions—these (and others), by the way, differ slightly from the values given in some of our best standard works; the 'parallax of the sun' is not given on page 33, to which we are referred, and though mentioned often elsewhere, its value is not stated; there is no list of the asteroids, etc. These, however, are only slight oversights in a work that contains such a large amount of carefully arranged instruction for any one who wishes to begin the interesting study of the starry heavens.

Rulers of India.—The Marquess of Dalhousie. By Sir W. Wilson Hunter, K.C.S.I., C.I.E., etc. Oxford: The Clarendon Press, 1890. Pp. 229. *Price* 2*s.* 6*d.*

This is an excellent sketch of the character and achievements of the last, and perhaps the greatest, of the men who built up our Indian Empire. The map of the India which he handed over to his successor in 1856, substantially the map of India as it now is, was, as Dr. Hunter remarks, a very different thing from that which he studied on his voyage to India in 1847. By conquest and annexation he had extended the frontier of British dominion on the north-west, north-east, and south-east, so as to include within it the Punjab, Sikkim, Lower Burma, etc., and to bring the Indian Empire into direct touch with the great Asiatic Powers; while he had filled up the centre by incorporating the extensive territories of Oudh, the Central Provinces, Jhansi, and other smaller states. The story of the events connected with these great acquisitions is told with admirable conciseness in a style that is always clear, animated, and vivid; and not less successful is the exposition of the circumstances that led up to and justified Lord Dalhousie's action. A second section is devoted to the measures by which he pacified and consolidated these large accessions of territory and secured for them good administration; while a third contains a brief but comprehensive and lucid sketch of the great measures which have so powerfully contributed to develop the resources and further the general well-being of the country, viz., the planning and organising of the

postal, telegraph, railway, and educational systems. These unifying and consolidating agencies, which have created the India of to-day, with its commercial and intellectual activity, are the immediate results of the liberal statesmanlike views which guided him throughout his career. The whole is preceded by a sympathetic account of the early life and character of the man whose "omnivorous activity, imperious will, and austere conscientiousness" have given to him a place second to none among the heroes of Indian history. If not absolutely free from the tendency to rhetorical exaggeration and largeness of phrase, which occasionally detracts from Sir W. W. Hunter's pictorial style, the book is, on the whole, one that can be recommended as a model historical monograph and worthy of its great subject.

Rulers of India.—Cornwallis. By W. S. Seton Karr. Oxford: Clarendon Press, 1890. Pp. 202. *Price 2s. 6d.*

The author of this Memoir was a well-known and very able Indian official, for many years a Judge in the High Court of Calcutta, and afterwards Foreign Secretary to the Government of India, and is well qualified for the task.

The first portion of the book is largely taken up with the history and merits of what is known in India as the Bengal Permanent Settlement, effected by Lord Cornwallis. The subject is one which will interest Indian readers, but to the ordinary English reader will prove dry, and to many unintelligible. Perhaps too much of the book has been devoted to this question, and too little to the life of Cornwallis, who had a notable career both as a General and a politician, before he first went to India, and also after his return. He was engaged in the American war; as Viceroy and Commander-in-Chief in Ireland, in the troublous times at the end of last century; and also in negotiating the Treaty of Amiens in 1802. He returned at the age of sixty-seven to India in 1805, for a second term of office, but died within four months of his arrival.

Fifty Years in Ceylon. An Autobiography by the late Major Skinner, C.M.G., Commissioner of Public Works, Ceylon. London: W. H. Allen and Co., Lim., and at Calcutta, 1891.

There is probably no one to whom the colony of Ceylon is more indebted for the opening-up of the country than the late Major Skinner. He joined the Ceylon Rifles as a boy of fourteen, and before he had even time to procure his uniform, he was sent in command of a detachment of troops from Trincomalee to Colombo, marching across the island by Kandy. This the potential soldier successfully accomplished, leading his men through an almost unknown country. Very soon afterwards he was chosen by the Governor to aid in opening the Kandian Provinces by the construction of the great road up the Kaduganava Pass. From that time, till his retirement forty-eight years later, he was almost continuously employed in the survey of the country and the construction of roads. His devotion to duty, his untiring energy, and his unblemished integrity, combined with an unusually vigorous constitution, enabled him to accomplish an amount of work rarely achieved by a European in a Tropical climate. In 1830 he visited Singapore and Java. He tells how the Javanese welcomed the red-coated Englishmen again, and regretted that the Dutch were now their masters instead of the British. The whole story of Major Skinner's life is exceedingly interesting, and well worthy of perusal as the record of the services of a public servant whose memory the Government are still delighted to honour.

Vasco da Gama: His Voyages and Adventures.
Story of Magellan; or, The First Voyage Round the World.
Sir Walter Raleigh: His Exploits and Voyages.
Pizarro: His Adventures and Conquests.
Francis Drake, The Sea King of Devon.

By George M. Towle. London, Edin., New York: T. Nelson & Sons, 1891

These form part of the "Heroes of History" series.

They are written more especially for young readers, and although historically correct, avoid all dry details, and present the lives and adventures of these grand old heroes in a most entertaining form. The simple narrative of these early voyages reads like a romance, and the first contact of Europeans with countries and peoples about which so much is heard of in modern days cannot fail to interest every one who has watched the growth of civilisation over the world. The volumes are well got up, and admirably printed, and are just the kind of books for school prizes or gifts.

Friesland Meres and through the Netherlands: The Voyage of a Family in a Norfolk Wherry. By Henry Montagu Doughty. London: Sampson Low, Marston, and Co., Lim., 1890.

A voyage through the canals and meres of Friesland is a yachting experience rather out of the common run. The author and his family in a Norfolk wherry, comfortably fitted up as a house-boat, sailed amongst the little-known canals and meres of Friesland for two months. The boat was towed across from Yarmouth to Stavoren. After visiting many of the old walled towns and traversing innumerable canals and waterways in Friesland, the author made his way along the rivers Zwartwater, Ijsel, Rhine, and by other rivers and canals through part of Holland. The architecture and art treasures of some of the old towns are well described, as well as the peculiar manners and customs of the inhabitants. Two of the "dead cities" of the Zuider Zee were visited, and found to have a fair amount of vitality in them yet. There are some good illustrations taken from pen-and-ink sketches by members of the party. As a yachting trip, most people would, perhaps, find this journey a little monotonous and more suited to the taste of dwellers by the Norfolk Broads than sailors of the "blue water."

To South Africa and Back: Being the narrative of a Journey through Cape Colony, Natal, Orange Free State, and the Transvaal, including Visits to the Diamond and Gold Fields. By John Finch. With Illustrations. London, New York, and Melbourne: Ward, Lock, and Co., 1890. Pp. iv + 186.

Mr. Finch has presented us with a fairly good example of that large class of books of travel containing nothing very new or of engrossing interest, but, being simply written, quite readable in itself. We might, however, have been spared the long accounts of the voyages out and home, with the appreciative, if uninteresting, disquisitions on the commissariat department, conduct at public worship, etc. The volume is well printed, handsomely bound, and fairly well illustrated.

Voyage au Pays du Déficit. By Edmond Neukomm. Paris: Ernest Kobb, 1890. Pp. 298.

M Neukomm opposes the policy of the present Government of Italy presided over by Signor Crispi, and points out the troubles and dangers which this Ministry has entailed upon Italy. He cannot conceal his irritation at the alliance between Italy and Germany, which he calls "L'alliance fatale."

Handbook for Lincolnshire. With Maps and Plans. London: John Murray, 1890. Pp. vi+[30]+213+18. *Price 7s. 6d.*

Lincolnshire is the second largest county in England, is essentially an agricultural county, and has little manufacturing industry; but for all that it is not uninteresting. Its drainage and engineering works in the broad fens, and in the low lands at the mouth of the Trent, furnish subjects for study to the hydrographical engineer and to all who take an interest in the achievements of human skill and industry in the subjugation of nature by human enterprise. Sir William Dugdale devoted a large part of his celebrated *History of Imbanking* to a description of these works. Those who love to honour the great men of our race, and to follow their lives with reverent interest, will find much to engage their attention in the biographical associations of Lincolnshire. "The list of distinguished men of the first rank, either born in or closely connected with the county, is a remarkable one, and probably superior to that of any other county, except, perhaps, Devonshire and Middlesex," says the writer of this guidebook, and quite justly so: for the list includes such names as King Henry IV., Lord Treasurer Cecil, Archbishop Whitgift, Captain John Smith, Dr. Busby, Sir Isaac Newton, John and Charles Wesley, Sir John Franklin, Lord Tennyson, and a whole crowd of minor celebrities. The readers of Charles Kingsley's *Hereward the Wake*, another county worthy by the way, know that Lincolnshire can even lay claim to at least one aspect of picturesque beauty—it has glorious sunsets and sunrises; and the enterprising are beginning to find out that there is a certain quiet beauty about those parts of the county in which Tennyson spent his boyhood. But more than all these, Lincolnshire boasts her greatest glory in her churches. At the head of them all stands Lincoln Cathedral, acknowledged to be one of the finest in the kingdom. Then there is Boston's great "stump"; and the remarkably elegant spires of Louth and Grantham challenge comparison with any in the world. Nor is that all; all over the county, but more especially in the ignored fens of the south, the traveller will see village church after village church remarkable for large size, great architectural beauty, and handsome spires.

The author of this, the first real guidebook to Lincolnshire—except Sir C. Anderson's little volume—has executed his task admirably; he conveys his information—plenty of it, yet not too much—with commendable accuracy, and in the clearest, briefest manner, as beseems the author of a guidebook. The writer—his name certainly deserves to be made known—besides, it is no secret in Lincolnshire—is the Rev. G. E. Jeans, the son of a former vicar of the county. He claims "to have read nearly every work bearing on the topography, etc., of the county, and, wherever it was possible, the existing account of each place has been revised on the spot." Moreover, he possesses one pre-eminent qualification for the task: he is a first-rate authority in matters appertaining to ecclesiology, to the architecture, furniture, and archæology generally of churches. He has furthermore had the valuable assistance of Rev. Precentor Venables of Lincoln in revising the proof-sheets. Mr. Jeans is certainly entitled to our heartiest congratulations on his signal success. We have noticed a few slips, almost inevitable to a first and original work of this kind. We append them for the publisher's use. On p. [12], 3d line from the bottom, read "Guthrum"; "Geoffry," is usually spelled "Geoffrey" (cf. pp. [13], 179); on pp. 5, 137, read "Streatfeild"; the date of the Lincolnshire rising is given variously on pp. 83, 110, and 127—the year 1637 is, of course, the correct date; Donington grammar school (p. 90) is the oldest building in the complex of schools, not the newest, as the text seems to imply; on p. 164, line 11, read "Stukeley"; St. John's Church

at Spalding stands on Hawthorn Bank, not on the Pinchbeck Road; "Roeskilde" (177) is a better spelling for the site of the Danish royal burial-place; Cressy Hall is, if we mistake not, in the parish of Surfleet, not in Gosberton; on the map—"Chale" is now usually written "Cheal," "Hoftlet" is better known as "Hoffleet," and "Pinchbech Bar" should be "Pinchbeck Bars"—all three between Spalding and Swineshead. We cannot refrain from observing that the heavy type (Clarendon?) used for the catchwords and in the index is not elegant: rather a decided eyesore—a remark, however, that does not apply to this guidebook more than to the rest of the series.

London of the Past: A Picture of the Olden City. By J. Ashton Ainscough. London: Elliot Stock, 1890. Pp. viii + 63. *Price* 1*s.*

Mr. Ainscough's work is, in several respects, likely to attract the attention of readers desirous of learning something about old London without having the description overloaded with archæological detail and comment; and for such purpose the book has been compiled. Yet, even for popular use, we imagine that the information given will, in many cases, be found scrappy, and therefore unsatisfactory. Nevertheless, there is much quaint and curious lore, principally gathered from Stowe, Pepys, etc., and, for superficial information, it may take the place of heavier works.

Muddock's Pocket Guide for Geneva and Chamounix. The "J.E.M." Series of Sectional Guides. London: Simpkin, Marshall, & Co. Pp. 50. *Price* 10*d.*

For its size and scope this guide will be found useful to pedestrians and climbers.

The Riviera; or, the Coast from Marseilles to Leghorn, including the Interior Towns of Carrara, Lucca, Pisa, Pistoia, and Florence. With Thirteen Maps and Thirteen Plans. Seventh Edition. By C. B. Black. London: Adam and Charles Black, 1890. *Price* 2*s.* 6*d.*

Among the many handbooks of the Riviera this is one of the best we have seen. It is of a convenient size, is well printed, and possesses excellent maps and plans, those of the Corniche Road and the Environs of Florence being especially good. It is well up to date, and is a perfect mine of information for the tourist and sightseer. Its very moderate price is not the least of its attractions.

Illustrated Europe. Nos. 117 to 132 inclusive. *Price* 6*d. per number.* Zürich: Orell, Füssli, and Co.

These sectional guides, in ten parts, carry us to and through Hungary, and are well adapted to the routes they describe, provided the traveller does not rest long at any one spot. They are well written and admirably illustrated. Considering their low price, the guides are highly to be recommended.

Recent Travel and Adventure. New Edition. Edinburgh and London: W. and R. Chambers, 1890. Pp. 288.

The present edition of this volume contains a brief article on Stanley's "Rescue of Emin Pasha," which, in a sense, brings it up to date. Among the other articles are—"Stanley on the Congo," "Through Masai-land with Thomson." "Three Years with Greely" (Arctic Regions), "General Gordon," "Lady Brassey's Voyage in the *Sunbeam*," "Nordenskiöld's Discovery of the North-East Passage," "Miss Bird's Trip to the Sandwich Islands and Rocky Mountains," "Livingstone in Africa," "Vambéry's Travels in Central Asia," etc. The book should be interesting to boys.

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R U S
Astrakhan
Volga R.
Ural R.
Guriev
Emba R.
Uralsk
Chegan R.
Bayardi I.
Kirel or Pelican I.
Merkvii Kultuk or Atvar G.
Kulali I.
Fort Alexandrovski
Buzachi Pen.
Mangishlik Peninsula
C. Urbuk
Kaidak or Karasu B.
Alti Kenti
Kasarma
Durt Kuduk
Tch. Penin.
Petrovsk
Sandy C.
Bishkti (St. Michael)
Kushcheta
Tokmu
Kinderlinsk
Ust Urt
Tabunsu
Kungrad
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Caucasus Mts.
Shemakha
Apsheron Penin.
Baku
Kara Bugaz
Kara Bugaz Gulf
Plateau
Kara Kum Desert
Kopetdagh Mts.
Krasnovodsk
Salyani
Kur R.
Kizilyach B.
Cheleken I.
Balkan B.
Tash Arvat
Balkan
Uzboi
Iadi
Lenkoran
Astara
185 feet below level of the Black Sea
Ogurchin
Little Balkan
Tuzanjik
Kizil Arvat
Akhal Tekke
Bami
Enzeli
Resht
Kizil Usen
Chat
Kara Tepe
Tchikishlar
Kasimabad
Korumabad
Abbasabad
Firabad
Ashurada
Chandyr
Bujnurd
Kuchan
Kizil Agach
Mazanderan
Elburz Mts.
Barfrush
Sari
Astrabad
Jajerm
Kasvin

OROGRAPHICAL MAP OF CENTRAL ASIA.

BY J. G. BARTHOLOMEW F.R.G.S.

British Geographical Magazine 1870

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

FROM THE MOUTH OF THE TANA TO THE SOURCE-REGION OF THE NILE.

By Dr. Carl Peters.

(*Read at Meetings of the Society in Edinburgh, Glasgow, Dundee, and Aberdeen, February* 1891.)

My task to-night will be to describe to you, in the fewest essential words, the progress of the German Emin Pacha Expedition on its march from the mouth of the Tana to the source-region of the Nile.

Before doing this I would briefly call attention to the fact that the object of the German Emin Pacha Expedition was to furnish Emin Pacha, in his isolated position in the Equatorial Province, with ammunition and men, and to enable him to maintain his position at Wadelai. With this object in view I should have preferred to take the route from Bagamoyo to the southern shores of the Victoria Nyanza, and from thence through Karagwé, had not the trouble occasioned by the Arab insurgents rendered the execution of this plan impracticable. I was consequently compelled to choose the Tana route, a hitherto unused, and for the greater part unknown, highway.

The peculiar political situation at Zanzibar and on the East Coast had furthermore rendered it impossible for me to organise a large expedition commensurate with the importance of its mission. I was, in fact, obliged to content myself with sixty carriers, ten camels, eight mules, and sixteen Somál; and with this caravan I began the march up the Tana. You can readily realise the difficulties that hampered me in my capacity as leader of the expedition, all the more as I had not succeeded in passing my articles of barter through the blockade on the Coast, which left me without wire and beads, the chief articles of trade for use in the Masai country, through which my route led. So I began my march from Vitu

at the end of July 1889, accompanied by only one white man, Lieutenant von Tiedemann. I reached the Tana near N'gatana, and instructed Lieutenant Rust and Mr. Oscar Borchert to form a second column, and to transport to me by boat, up the Tana, articles of barter and additional men. I may as well, however, mention here that this second column never succeeded in joining me. Lieutenant Rust fell ill and was obliged to return to Europe, after losing, through an explosion, the greater part of his baggage. Mr. Oscar Borchert thereupon tried, very pluckily, to overtake me with a handful of his men. He succeeded in penetrating beyond the Galla to the Upper Tana, but only to find that I was already eight weeks on my march westwards.

Arrived at the Tana, we met with many obstacles. This river, draining from Mount Kénia, makes a wide bend through Kikuyu, and afterwards forms immense cataracts. It flows, like the Nile, which it much resembles, through a narrow valley of alluvial deposit in a dry and barren tract of country. This alluvial deposit, in proximity to the river, is fertile, and is adapted to all kinds of culture. Besides tobacco, rice and *mtama* are there cultivated, as well as all kinds of leguminous plants, whilst most Tropical fruits can certainly be grown. It is a very small strip of land, but slightly cultivated by the Wapokomo, who inhabit it, and in consequence they are exposed every year to the danger of famine. The harvested grain is, for the most part, converted into beer by the natives and rapidly consumed, provided the grain be not first stolen by the Arabs on the Coast, or by the Somál in the north. The consequence is that the natives always suffer privation some weeks before the harvest, which, during the year of 1889, developed into a famine. To guard against this danger I bought of an Indian in Kau 100 bushels of grain, which I intended to transport in boats, keeping pace with the expedition. But the Indian sent only half of the amount of grain thus purchased, and furnished no boats, so that I was forced to remain several weeks at N'gatana, to which place the grain had been transported, in order to procure boats for my further advance, and above all to wait until the harvests farther up the Upper Tana had become riper. This delay at N'gatana was of an exceedingly disagreeable character in all that concerned the expedition, as my people were discouraged by the many adverse circumstances they had experienced on reaching the Tana, and were tempted to run away. Some, indeed, left me ; and I myself had to fight against sickness. Opposite N'gatana lies Lake Dumi, the swamps of which continually exhale a poisonous air, from which I contracted a nervous fever and suffered weeks of discomfort.

As soon as the maize crop showed signs of ripening I broke camp at N'gatana (August 25th). At first we pursued a north-westerly direction, and followed the left bank of the Tana, subsequently crossing the river at M'buyi and marching along the right bank. We kept outside the wood with which the entire upper and middle course of the Tana is fringed. We were, however, always obliged to camp close to the river, as the outside tract was dry.

It is difficult to imagine anything more delightful than these marches,

especially as the air in the early morning hours is so bracing and pure. The eye roams over immense tracts of *acacia* and *cacti*, sparkling at early dawn with pendent dewdrops. Even if this region be unsuitable for agricultural purposes it contains food enough for game of all kinds. We may see the graceful gazelles grazing, and herds of bucks of all kinds sporting and gambolling in their freedom. Every morning we encounter traces of the elephant or the heavy spoors of the rhinoceros. Above our heads fly the wild-goose, the crane, and the eagle,—offering an enticing mark for the rifle. The river in the far distance winds on its sinuous course. A sense of peace and majesty pervades the whole scene.

The right or south bank of the Tana is better cultivated than the north bank, and the best route accordingly passes along the former. For this reason I crossed the river at M'buyi and kept on the same route up to the source-region of the river. Seventy Arabs of Kau had hastened on in advance of my expedition to stir up the riverain natives, the Wapokomo, against me. "Give the whites no food" was their hostile advice. In consequence, my people had constant quarrels with the Wapokomo. The latter are a people of athletic build, but they are very cowardly. Their villages stud the river, hidden among the woods, and their intercourse with the outside world is almost exclusively by means of boats called *miaus*. They are a timid people, as they themselves acknowledge, and are constantly endeavouring, like hares, to escape every real or imaginary danger by flight. Much to my regret, I was repeatedly compelled to adopt rigorous measures in order to force the chiefs to sell me and my men grain. The districts on the Lower Tana are best cultivated near Nderani and Akinakombo, as well as in the Massa country, where I arrived on the 12th of September. The alluvial deposits cease just beyond Massa, near Kidori; and the plain, with its steep banks, prevails up to the Tana.

This point I regard as the dividing line between the lower and middle course of the Tana. The lower course has, accordingly, a length of 130 English miles. The Tana is navigable along this entire stretch of country, as well as along its middle course. The middle course, extending to Hargazo, where the mountainous country commences, is just about as long. The Tana is therefore navigable for about 260 English miles. Beyond this line of demarcation the river is broken up into numerous cataracts, some of which are formidable, and of course render navigation impossible.

Just beyond Massa we reached a plain wholly occupied by a hunting-tribe, the fleet Waboni, no individual member of which did we at any time catch sight of. Here all cultivation of the soil ceases. Being, therefore, unable to collect provisions for the march, the expedition suffered from partial famine. We marched for six days, from early morn till late at night, in order to reach the settlements of the Galla beyond us. The sun was vertical over our heads, and a dry scorching heat was experienced for days together, and nearly made us faint from exhaustion. The woods bordering on the river are here so thick and impenetrable that it is only possible to reach water at certain well-known spots. As we were without guides it gave me great trouble to find out those places. Fortunately, an English expedition under Mr. Smith, accompanied

by guides, had preceded us, and we made use of their traces to reach water day by day. Mr. Smith's expedition had, as we learned later, been attacked and driven back by the Somál, but had continued their march to Oda Borru Ruva, on the right bank, and had safely reached that place.

We finally marched into Oda Borru Ruva on the 22d of September, after experiencing almost incredible difficulties and hardships. Here dwelt a dispersed tribe of the Galla-Borani, which appears formerly to have come from the north, and to have crossed the Tana before the Somál, going south, but afterwards to have been driven northwards by the Wakamba, who now occupy their chief settlement on one of the islands of the Tana, called Oda Borru Ruva. The Galla have graceful and slender bodies. Though they are warlike, they have been much reduced in numbers on account of the many battles they have been obliged to fight in their struggle for existence. I at once entered into friendly relations with them, and pitched my camp on the right bank of the Tana, opposite the island of Oda Borru Ruva. But misunderstandings soon arose. Mr. Pigott had established a station on the island, which had been burnt by the natives. On sending over to guard another English station left without protection, the Galla declared there was no longer any English property in their hands. The Galla had furthermore kidnapped a number of Swahili slaves from the Sultanate of Vitu, whom they forced to work in the fields. As the Sultanate of Vitu was at that time under German protection, I took the kidnapped slaves under my care, promising them shelter in my camp, provided they could prove themselves to have come from Vitu, and to have been stolen by the Galla. Thirteen slaves, finding acquaintances in my camp, were able to give the required proof, whereupon I requested the Sultan Hujo to deliver them up.

The Galla, however, preferred to risk the fortunes of war. During the night of October 6th, after I had turned in, the report was brought me by my outposts that two Galla slaves on the other side had informed them that the Galla had resolved to attack my camp and put all the slaves in irons. In such emergencies I always consider it best for the weaker party to get the start of the other; so I crossed the Tana during the night with thirty-five men and marched by the light of the full moon to the Galla kraal, about half-an-hour distant.

I was received with wild cries, and, on my stepping into the midst of the Galla, crying out, "Peace! Peace!" in order to confer with their chieftains, the only answer was a discharge of spears, one of which I barely escaped by being quickly pulled to one side by one of my men. At this juncture I struck the back of my head upon a gun-barrel in falling. I was thus forced to fire upon the enemy, as a result of which the Sultan and seven of his chief men were killed. Thus the Galla tribe was dispersed, some of the blacks running even as far as the Coast, where they spread the report that I had been killed, and my whole expedition dispersed, whereas just the opposite had happened. In order to protect myself against further attacks on the part of the Galla, I made prisoners of all I found in the kraals, among them twenty-three women and girls

and several men. Moreover, I set free over thirty slaves, and in the course of the next few days captured nearly eighty boat-loads of grain. It was, however, long before I could gain anything from the destruction of this flourishing settlement on the Upper Tana. I therefore entered the next day into negotiations with the Galla, at the same time setting the male captives at liberty, and promising to deliver up the women as soon as the Galla had concluded a treaty of peace with me. Many councils having been held, a treaty of peace was concluded on the 20th of October.

Not having heard any news of my second column for three or four weeks, I continued my march up the Tana on the 22d of October. It was some time before I could make up my mind, with such a small force and without articles of barter, to hazard a march into the Masai country, lying before us—an almost unheard-of undertaking. Mr. Pigott had before tried to advance up-river, but owing to the entire lack of grain in the plains he was compelled to fall back on Mombaza. Whilst the island of Oda Borru Ruva represents, as it were, an oasis in the plains, capable of raising all kinds of culture, we now entered a perfectly unknown country. The Tana above Oda Borru Ruva forms a peculiar system of river-branches: islands form and prevail in the river-bed as far as the mountains, where the upper course really begins. The river at this point becomes exceedingly broad, and the islands—which are covered with green bushes—present a very beautiful appearance.

At Oda Borru Ruva, from which place I had ordered a flotilla of boats to follow me, I began my search for the parallel-flowing and equally large stream called Kiloluma, which is put down on the old maps as coming from the north. But I may as well at once say that no such stream exists. "Kiloluma" is the Ukamba word for water-falls and cataracts, and the entire Upper Tana bears this name in the language of the Wakamba owing to its many waterfalls and rapids. The belief that the river is divided into two branches on entering the mountains is, on the other hand, owing to a bifurcation of the river near Hargazo, which I regard as nothing more than a part of one and the same river, caused by an island, a mile-and-a-half long. The woods along the river between Oda Borru Ruva and this bifurcation of the river are very extensive, rendering access to the river very difficult. After passing Hargazo we enter the threshold of the mountains. The route then leads over a terrace-like country, such a terrace appearing in the distance like a steep mountain. After climbing one of these terraces we find ourselves again on a plain with another such steep mountain before us, which, on our attaining its crest, again proves to be only another of these terraces. A mountainous country on the right bank of the Tana extends in a northerly direction—to which range I gave the name of Emperor William II. Mountains, in honour of his Majesty—while the mountains on the left bank of the Tana continue to increase in height. The Tana now forms a number of cataracts, and the mighty stream becomes divided into a number of roaring brooks, rendering all navigation impossible.

Soon after leaving Hargazo we enter the country of Murdoi, occupied by the nomadic tribe of the Wandorobbo, who are related to the

Masai. In the autumn of 1889 this tribe was driven by the drought prevailing in the back-country into the neighbourhood of the river, and I think it is owing to this circumstance that our party did not share the fate of the Pigott expedition. The Wandorobbo go perfectly naked, and are armed with Masai spears and lances. They are, like the Masai, very bold; and they soon began to pick a quarrel with us.

As they repeatedly failed to keep their word with me, and, in fact, treacherously attempted my life by means of poisoned arrows, I attacked them, putting them to flight, and capturing 250 head of cattle, which latter I drove along with our party.

From here we marched to a lovely, rolling, and mountainous country, called Thagga, which extends on both sides of the Tana. On the slopes of the hills nestle pretty hamlets, scattered through the plantations, and there are great herds of grazing cattle. The Wathagga belong to the Bantu race, and are closely related to the Wakamba and the Wakikuyu. They, too, had never seen a white man, and cried out with joy on observing our boots, which they took for asses' feet, and our guns, which they took for clubs. They robbed one of my carriers, and tried to get possession of my mule. Whereupon I had 600 head of their cattle driven from their pastures into my camp. The Wathagga then attacked our camp in great numbers, but were repulsed after a short struggle.

The Thagga country seems to be well adapted for plantations, and has a cooler climate owing to its superior elevation. I can most heartily recommend it to the British, in whose territory it lies. The inhabitants need only a firm hand to render them docile to the government of the whites, and appear to be capable of working. They are of a sanguine temperament, like the Wakamba, and like to deck themselves out in a knightly fashion; their women especially understand how to adorn themselves with beads and rings and to challenge the admiration of strangers.

On issuing from the Thagga country, which in my case was accomplished only after repeated conflicts with the natives, we enter the Ukamba-Mumoni country. The course of the Tana, which hitherto had flowed from the north-west and west, here deviates more and more to the south-west and south. According to my map it makes a decided bend from the south. As I had no intention of exploring the Tana, but was on my way to the Equatorial Province which lay before me in a north-westerly direction, this deviation of the river from my true course became daily more annoying. I accordingly resolved to at once force a passage through the Mumoni Mountains, all the more as these mountains, covered with a primeval growth of trees, rendered our advance, in the rainy season which was just setting in, exceedingly difficult. We often had to use the axe from six o'clock in the morning until six o'clock in the evening, and, even then, we found in the evening that we had advanced only 2-3000 paces during the day. I spent ten days in the Mumoni Mountains in building a bridge over the roaring torrent. This bridge was constructed by sinking props or piles into the river and fastening them by cross-beams. Then beams were laid lengthwise, from the projecting ends of which new piles were sunk in the stream. Towards

the middle, where the current was strongest, I endeavoured to strengthen the bridge by tree-trunks pushed out from the banks and by guy-ropes. Twice the current bore away the bridge just as it was on the point of completion. As the Tana receives most of its waters from Kénia, which is generally hidden in clouds, the level of the river is subject to great fluctuations. As soon as the clouds round Kénia are dispersed, and the rays of the sun fall vertically upon it, immense quantities of water come down the river. This accounts for the irregular rise and fall of the water in the river even during the dry season. So I found myself compelled, after the second bridge had been carried away, to continue my march along the right bank. Having passed the Mumoni Mountains we again emerged on the plain, which was devoid of all human life, the haunt only of elephants, antelopes, and roebucks; where night after night the lion roared around our tents, and the hyæna howled horribly. Thus, day after day passed, and the general feeling among my party was one of great depression. But, on the 11th of December we again perceived for the first time traces of human beings, and soon after caught sight of men on the opposite bank. They were people from Kikuyu, who informed us that we should reach that place the next day. This proved to be true. On the 12th of December we finally arrived in the splendid mountainous country of Kikuyu, which is unquestionably within the limits of the British Possessions.

We were now in a country 5000 ft. in elevation, and the temperature was almost European. The mercury repeatedly sinks in the night to the freezing-point. In the morning the fields are covered with hoar frost. Kikuyu is a mountainous region lying near the Kénia plateau. The villages lie scattered over the gently rising slopes, the land being almost as much cultivated as in Europe. A number of clear brooks ripple through the ravines, the temperature averaging about 66° Fahr. The soil here is favourable to every growth; and, if it were not so far from the Coast, the country would be admirably adapted for settlement by Europeans. It is a land truly "flowing with milk and honey." Bananas, leguminous plants of all kinds, *mtama*, maize, besides cattle, sheep, goats, and innumerable fowls afforded an agreeable change of diet, compared with that which we had had for the past few weeks. It was in Kikuyu that Count Teleki had evinced the superiority of European arms, one result of which was that the natives here assumed a peculiar attitude towards us: they were either timid and shy or showed a disposition to commit petty larceny. I soon made peace with the elders, but the younger members of the community could not restrain their thievish propensities, although, as a matter of course, I responded to all attempts at robbing the cattle-pens by shots from repeating rifles, a manner of proceeding that was made known to all the natives by their elders. I regret to say that, during our seven days' march through the country, we had slight skirmishes almost daily, so that I was not sorry when, on the 19th of December, we finally reached the western confines of Kikuyu. On our right Mount Kénia raised its proud and beautiful crest to the sky. The mountain is about 18,400 ft. high, and has a conical summit, covered with snow and ice, which formed an invaluable landmark for my expedition,

as I had no guide, and knew its geographical position to be just about on the Equator.

The country was now about 8000 ft. in elevation. I have never breathed such pure air. We had reached the Leikipia plateau. It seemed as though the eye could traverse the gently undulating valley into illimitable realms. Every hill, every tree, almost every leaf, appeared to us to stand out in bold relief. The game seemed so near that we involuntarily grasped our rifles, to bring down a few specimens; but we were much surprised when the bullet fell short of its mark. We would march onwards for days without apparently getting closer to Mount Kénia, from which we were several days' march distant, although it looked as if it could be ascended in a few hours. This plateau enjoys almost a perennial spring, or at least the seasonal change is very slight; but the diurnal range of temperature is as much as 80° Fahr., as during the night the mercury falls below zero. It is inhabited by the most savage tribes of the Masai, who, nomadic-like, drive their herds from one pasture ground to another and from one watering-place to another.

At this point my little expedition encountered great difficulties. Not being able to pay tribute to the Masai, and, on the other hand, being indisposed to put up with the insolence of these habitants of the steppes, I was compelled on my part to attack them. I drove them out of Elbejeto, taking from them 2000 head of cattle, after they had descended on my camp during the night of the 21st of December and had stolen two tons of goods and had also thrown their spears. On my attempting to leave Elbejeto, a bitter fight ensued in the wood bordering the Ngare Gobit, which flows into the Guaso Nyiro, in which fight all the Elmorans of the neighbourhood took part, numbering more than a thousand warriors. The Masai lost nearly 150 men in this battle, while I lost only 11; but we were obliged to waste most of our ammunition. In order to further intimidate the Masai, I ordered Elbejeto to be set on fire, and also the neighbouring quarters of the warriors. I then proceeded on my march down the Guaso Nyiro.

The Guaso Nyiro rises in the mountains near Lake Naivasha, and takes a north-north-easterly course past Kénia. This stream I followed until where it is joined by the Guaso Narok, again following it in a south-westerly direction, to the point where it bends to the south.

I will not here enter further into details concerning the Masai, as my time is too short, and your countryman, Joseph Thomson, has already given you such particulars. I was continually obliged to fight with them. I may mention, however, that they attacked me at ten o'clock on Christmas Eve, 1889, but were repulsed after a struggle of three hours. I was obliged to again enter into an engagement on the 26th of December from 3 to 5 P.M., when I likewise repulsed them. My experiences during these few weeks may sound almost Quixotic, and I am grateful to God for having rescued me from these terrible and constant dangers. Our principal peril was, however, want of water. As I was without a guide I was forced to lead the column myself, and finding water was always more or less a matter of chance. On December 31st we failed to find any water, which had a disastrous effect upon the cattle I had driven along with me.

Finally, after endless hardships we saw on January 6th, 1890, the lovely Lake Baringo at our feet, and on the 7th we reached Njemps, on the Guaso Tigerish. We thus left behind the perils of the Masai country. The country round Lake Baringo has been described by former travellers, Dr. Fischer and Joseph Thomson having already explored the country, whilst Teleki and Höhnel's expedition furnished the most exact particulars. The natives here belong to the Masai stock. They have been dispersed through warlike encounters with other tribes, for which reason they live on a hostile footing with their neighbours. The Masai round Lake Baringo carry on agriculture and cattle-raising, and are dependent upon the whites, trusting to us for protection against the Masai of the high-plains.

I have a few words to say concerning the geological formation of this part of Equatorial Africa. The whole is a region of past volcanic activity, the chief seat of disturbance lying probably round Lake Baringo. The entire district of Lake Baringo I regard as a great and very old crater, with a diameter of sixty English miles, as it extends from Donyo Gelesha to Elgeyo. Four mountainous formations, similar in structure, are ranged round this centre of volcanic activity : Kénia. the Subugu la Poron, the Tschibtscharagnani, and the Elgon. The high-plateau, which we began to ascend near Hargazo, gradually descends to within 4000 feet of the Victoria Nyanza. At its highest part, on the Leikipia plateau and at Elgeyo, it reaches 8000 to 9000 ft. in elevation. The whole is of an uniform formation, which very probably extends farther, to the other side of the Victoria Nyanza. I remained six days at Lake Baringo in order to afford my column, and particularly Herr Tiedemann, time to recover from dysentery, after which I continued my march westward. We next had to ascend Kamassia, which Mr. Thomson has already described. The people of Kamassia, as well as of Elgeyo, belong to the Masai stock ; and I had to fight my way through both countries, as the natives would not let me pass without paying tribute. But in neither case did I have any difficulty in repulsing those who attacked me. Indeed, the warlike character of these tribes, and the danger thereby resulting to Europeans, seems to me to have been very much exaggerated. I think it very proper, for the development of Africa, to let the natives appreciate the superiority of our arms, seeing that they are so ready to harass and impede the progress of European caravans, and thus accustom them to offer no impediment to the progress of our traffic.

Having climbed the steep slopes of Elgeyo we come to the Angatana Nyuki, a district also formerly inhabited by the Masai, but which has been perfectly laid waste by other (Masai) tribes. It is over 8000 ft. above sea-level, perfectly devoid of trees, and, with its sharp outlines, has a weird aspect. Game abounds, however, especially immense herds of buffaloes, which traverse the steppes, and, besides, roebucks and antelopes of all kinds. I continued to advance without a guide, trusting solely to the compass for about the space of a week over these high-plains through the Surongai Hills in the direction of Kabaras. Kabaras is the most northerly part of the Kavirondo country, at the north-eastern corner of the Victoria Nyanza and is, in contrast to the bare steppes we

left behind us, richly cultivated and abounding in all kinds of food necessary to an exploring expedition. I learned in Kavirondo that a European exploring party had pitched their camp in Kwasundu. This was, as I afterwards ascertained, Mr. Jackson's expedition, who had orders to support Stanley's undertaking in the Equatorial Province. The expedition had, however, received news in Kavirondo of Stanley's march and had halted there. The members of this expedition were, during my presence in Kavirondo, absent on a march to the north to buy ivory and hunt elephants.

I was unable to obtain any authentic information from the chief of the station, the Somál Ali, concerning the fate of Emin Pacha. I was told expressly that Emin Pacha was still in the Equatorial Province, and that only his companion Casati had accompanied Stanley on his march to the Victoria Nyanza. In consequence of this I made up my mind to continue my advance to the north-west beyond Kavirondo, and to strike the Equatorial Province somewhere near Fauvera. On the 2d of February, therefore, I marched in a north-westerly direction from Kwasundu, again entering regions hitherto untraversed by white men. Here there are well-cultivated districts on all sides, governed by independent sultans. The natives beyond Kavirondo are called Walukuma, a harmless tribe closely related to the Wa-Kavirondo. To the north of these dwell the Walundu, who seem to have intermingled with the Masai and to be much feared by the neighbouring tribes. The western boundary of Kavirondo would appear to be a ridge of mountains, which, however, on nearer approach, are seen to form two mountain-groups, between which a plain twelve miles wide affords an easy passage.

Kwa Telessa is the principal place of this region, where the peculiar costume of the Waganda first attracts notice. Kwa Telessa lies on the frontier of Usoga, and is the principal market town for the exchange of the products of Kavirondo and of the powder and arms carried by the Arabs to Uganda and Unyoro and from thence to Kavirondo to be sold. Here I learned that two white men were said to be in Eastern Unyoro, whose description seemed to be that of Emin Pacha and Casati. I sent letters in advance to these white men, and crossed the mountain ridge bounding Usoga on the north, and to which I gave the name of Wissmann Hills. The country, after crossing the "Wissmann Hills," assumes quite a different character. Banana groves appear, the whole region seeming to be one great banana grove, among which very tastefully built villages were scattered. The region is rich in cattle, and all kinds of grain are cultivated. This is the country of Usoga, the northern part of which is also called Wachore, belonging to Uganda. I found on my arrival in Usoga a number of Waganda fugitives who had crossed the Nile to escape the horrors of the civil war in that country, and who begged me to espouse their cause (the king and the Christians then living on one of the islands of the Victoria Nyanza) and to conduct them back to Uganda. One of these Waganda, Mario by name, informed me that Amdallah, of the Equatorial Province, had gone off with Stanley, and that there were no more whites in Unyoro. At his suggestion I sent a missive to the whites on the islands of the Victoria Nyanza, and to King Mwanga, to

inquire whether Emin Pacha had really left, or was still in the Equatorial Province; and in the meantime I continued my march.

News came sooner than I had expected. As early as the 13th of February I received a missive, written by Mr. H. M. Stanley, briefly informing the English in Kavirondo that he had arrived with Emin Pacha and Signor Casati as early as the end of August 1889 at the south end of the Victoria Nyanza. Thus, all was clear to me: I should have to give up proceeding farther in a north-westerly direction, although within six days' march of my goal; and I now had to decide whether I should return, which I could do with honour and a clear conscience, as the object of my search was found, or whether, yielding to the entreaties of the Waganda, I should aid the Christians in their contest against the Arabs. After brief deliberation, I decided to adopt the latter course; and the morning of February 14th found me on the march in a south-westerly direction, in order to reach the Nile at Jinja (at the Ripon Falls), and to cross the same. On the 17th of February I lay encamped near Ukassa, on the spot where Bishop Hannington had been murdered five years before. We, indeed, found a number of skulls and bones, bearing witness to the catastrophe.

On the 18th of February I saw for the first time the waters of the sacred Nile at my feet—for me an entrancing sight, when I considered what troubles and exertions it had cost me to march from the mouth of the Tana to the head-source of the Nile. I crossed the river the next day and entered Uganda, whereby I was enabled to benefit the Christian cause and the cause of humanity. My expedition was, as your distinguished countryman, Dr. Felkin, can bear witness, the first expedition of whites starting from the Indian Ocean to reach Uganda from the East. The time that it had taken us, not counting the stay in Oda Borru Ruva, was about 4½ months. But I scarcely think this route will ever prove practical for traffic in East Africa. The Tana, in spite of the fact of its being navigable for 260 miles, bends too much to the south and leads through too many inhospitable districts for it ever to be used in the development of the Baringo trade. I think that the route from Mombaza or Pangani will remain the best in future. But I do believe that the valley of the Tana, and the regions of Thagga and Kikuyu are, under European management, likely to experience great development in the future; and this is the task that has devolved upon the British, as all the countries through which I passed on my march to Uganda have been brought within British jurisdiction. I, for my part, wish the British "God speed" in this work of civilisation, a work also in the general interests of humanity; and I shall greet with great satisfaction all progress which your countrymen make in those regions.

THE MAPPING OF THE WORLD.

By John George Bartholomew, F.R.S.E., F.R.G.S.

Part III.—Asia.

(With a Map.)

Cartography probably originated in Asia, some centuries before it was known in Europe, but it has never flourished in the land of its birth. In Asia there is to-day really more unsurveyed country than there is even in Africa. This is partly attributable to the inherent conservatism of the Asiatic nations, which is opposed to the adoption of an alien or progressive civilisation. Now, however, Asia is practically becoming a continent under European influence. The superior civilisation of European nations is gradually bringing it under greater control; and it is in this way that we are now acquiring a more accurate knowledge of its geography. It is true that the Chinese and other peoples have long had their own native maps, but they are of a very rudimentary character. The art of scientific surveying and accurate mapping all over the world seems only to be practised by Europeans, and, consequently, we have surveys and good maps outside of Europe only in countries that are European possessions, or where it is in the interests of Europeans to survey them for military, scientific, or commercial purposes. A glance at the accompanying map will fully illustrate this. It will be seen that there are British surveys in India, Burma, Persia, Palestine, etc.; French surveys in Tonquin; Russian surveys in Siberia and Central Asia—in fact, at the present day, the surveyor is the pioneer of settlement, just as is the explorer of immigration.

Up to the close of the thirteenth century Asia beyond the Caspian Sea and Persia was a more or less mythical region, but at about that time the wonderful travels of Marco Polo revealed to Europe the riches of the great empires of China, Japan and India, and of the East Indies. European merchants, allured by the glowing accounts of the wealth of those countries, then began to direct their energies eastward; and thus our knowledge of these countries steadily increased, while, at the same time, our influence over them became stronger. At length, the Dutch settled in the East Indies, the British in India, and the Russians controlled the plains of Siberia. Then came the period of exploration and of more accurate knowledge: the countries became more open to travellers, routes were mapped, trading companies initiated land-surveys, and navigators undertook sea and coast surveys. In 1802 the great survey of India was commenced at Madras. The Survey Office is now a large and important department of the State, annually producing great numbers of maps

of India and the surrounding countries. The Russian Government is equally busy, especially along the Chinese frontier and the route of the projected Trans-Siberian railway. The Dutch and the Germans are at work in the East Indies, and the French are mastering the topography of the frontiers of China and Siam. Unlike other Asiatic nations, Japan, instead of being Europeanised and perforce surveyed, herself took the lead, and decided to employ European assistance in that direction. China still maintains her hermit-like independence, but in the present age of active progress that will probably not last long.

The following is a general summary of the amount of geographical survey work accomplished in the continent, which corresponds with the colouring on the map :—

Area of Detailed Topographical Surveys, (*Scale* 1 : 500,000 *and larger.*)	1,500,000	sq. miles.
„ General Topographical Surveys, (*Scale* 1 : 63,360 *and larger.*)	1,570,000	„
„ Geographical Reconnaissance Surveys, (*With Travellers' Route-Maps, etc.*)	6,180,000	„
„ General Geographical Sketch-Maps, (Largely approximate.)	8,240,000	„
„ Unexplored Country, . . .	750,000	„
Total Area of Asia, . . .	17,230,000	„

In classifying the maps according to their topographical value, I have adhered to the arrangement already adopted in my Map List for Africa—viz. :

A. Detailed Topographical Surveys.

B. General Topographical Maps, compiled from reliable surveys.

C. Detailed Geographical Maps, compiled from travellers' itineraries, supplemented by *data* which are only approximate and hypothetical.

* Maps marked with an asterisk cannot rank as original compilations ; they are mostly reliable reductions from the best maps, corrected to date and published for popular use.

† Maps which are simply itineraries.

(The latest published map is in each case mentioned first.)

N.B.—*The maps published by the Intelligence Branch of the War Office in London are not for sale, but most of them may be consulted at the Geographical Societies' Rooms. It may also be explained that many of the maps in our list are only to be had in books of travel and in publications of Geographical Societies.*

I have again to acknowledge my indebtedness to Mr. F. Bosse for his invaluable assistance in compiling the lists of maps from the numerous and varied sources that had to be investigated.

MAPS OF ASIA.[1]

Names of Maps published by Governments are printed in italics.

Only the best and most recent Government and private publications are here mentioned.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
GENERAL MAPS.	* Stieler's Uebersichtskarte von Asien. Gotha: Justus Perthes. Price 8d., .	1:30,000,000	473·4	1	1891
	* Stieler's Karte von Nord und Mittelasien. Gotha: Justus Perthes. Price 8d. .	1:20,000,000	315·6	1	1891
	* General Map of Asia, constructed from the best authorities. Edin. and Lon.: W. & A. K. Johnston. Price 15s., .	1:9,218,880	145·4	4	1889
	* Generalkarte von Asien. Von F. Handtke. Glogau: Flemming. Price 1s., . .	1:18,886,000	298·7	1	1889
	* Asiens Eisenbahn-und Telegraphenlinien. Von Dr. F. Umlauft. Wien: A. Hartleben, ...	1:20,000,000	315·6	1	1889
	Uebersicht der ethnographischen Verhältnisse von Asien und von den angrenzenden Ländern Europas. Von Vincenz von Haardt. Wien: Eduard Hölzel, .	1:8,000,000	126·2	6	1887
	* General Map of Asia. By A. Ilyin. St. Petersburg: A. Ilyin, ...	1:8,400,000	132·4	6	1884
	Skeleton Map of Asia, showing the successive Russian acquisitions in Asia. London: Intelligence Branch, War Office, ...	1:36,432,000	575·0	1	1882
	* Stanford's Library Map of Asia. By Keith Johnston. London: Edward Stanford, Price 25s., ...	1:6,969,600	110·0	4	1881
NORTHERN ASIA.[2] RUSSIA IN ASIA. GENERAL MAPS.	*C. Map of the Southern Frontier Districts of Russia in Asia (in Russian),* . .	1:1,680,000	26·5	27	1889
	* *Map of Asiatic Russia, showing Military Districts. London: Intelligence Branch, War Office,*	1:10,083,383	159·1	1	1886
	* Map of Russia in Asia (in Russian). St. Petersburg: Ilyin, ...	1:10,300,000	162·5	1	1885
	C. Itinerary Map of Russia in Asia (in Russian), ...	1:2,100,000	33·1	14	1885
	C. Map of Russia in Asia and the adjacent Territories (in Russian), . . .	1:4,200,000	66·2	8	1884
	* *Map of Russia in Asia (in Russian),* .	1:8,400,000	132·4	4	1878
	C. Military Road Map of Russia in Asia (in Russian), ...	1:2,100,000	33·1	14	1874-89
	C. Map of the Boundaries and Routes between the Empires of Russia and China. By Colonel Venukoff. Calcutta: Surveyor-General of India, ...	1:4,200,000	66·2	2	1877
WESTERN SIBERIA. GENERAL MAPS.	*B. New Map of Western Siberia (in Russian),*	1:840,000	13·2	14	1889
	B. Map of Western Siberia (in Russian), .	1:1,680,000	26·5	6	1885
	B. Special Map of Western Siberia (in Russian),	1:420,000	6·6	?	1880
	C. General Map of Western Siberia (in Russian),	1:6,300,000	99·0	1	1878
		1:2,100,000	33·1	1	
DISTRICT MAPS.	*C. Map of the Omsk Military District,* . .	1:1,680,000	26·5	12	1885
	Frontier Map of Western China (in Russian),	1:210,000	3·3	?	1884
		1:840,000	13·2	?	1882
	B. Map of North-Western Mongolia (in Russian), ...	1:420,000	6·6	1	1880
	* *Map of the Government of Omsk and the N. E. district of Tartary. London: Topographical Department, War Office,*	1:750,000	11·8	4	1879
EASTERN SIBERIA. GENERAL MAPS.	*B. Surveys in Eastern Siberia as part of the Maps of the Southern Frontier Districts of Russia in Asia. (See General Maps of Russia in Asia),*	1:1,680,000	26·5	16	1886
	C. Map of Russia in Asia. (See General Maps of Russia in Asia), ...	1:4,200,000	66·2	8	1884
		1:8,400,000	132·4	4	1878

[1] It has been found inconvenient to include the East Indian Archipelago in this section as a division of Asia, but it will be dealt with in the section devoted to Australasia.

[2] Maps published by the Russian Government are issued from the General Staff Office, St. Petersburg.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Northern Asia— *continued.* DISTRICT MAPS.	*B. Map of the South-Ussuri Region. By Col. Nadaroff (in Russian). Translated from the Proceedings of the Russian Imperial Geogr. Society. By Lieut. Col. J. C. Dalton,*	1 : 630,000	9·9	1	1889
	C. Karte der Neusibirischen Inseln und des Jana Landes. Petermann's Geogr. Mitteilungen,	1 : 3,000,000	47·3	1	1888
	C. Map of the Environs of Lake Baikal. By M. Venukoff (in Russian). Cherki,	central 1 : 420,000	6·6	2	1886
	C. Map of the Transbaikal Province,	1 : 2,100,000	33·1	1	1886
	* *Outline Map of the Russian Pacific and neighbouring Chinese Provinces. London: Intelligence Branch, War Office,*	1 : 4,118,400	65 0	1	1886
	B. Map of the North-Ussurian Region. By Col. Nadaroff (in Russian),	1 : 1,680,000	26·5	1	1885
	C. Umriss-Skizze der Bering Insel, hauptsächlich nach eigenen Aufnahmen von Leonhard Stejneger. Deutsche Geogr. Blätter,	1 : 383,000	6·4	1	1885
	C. Route-Map to Aigun (in Russian),	1 : 1,050,000	16·5	1	1885
	C. Map of North-Eastern Mongolia (in Russian),	1 : 2,100,000	33·1	1	1885
	C. Oro-hydrographical Map of the Territory of the Lena, Amur, and Yenissei, and the island of Sakhalin (in Russian). By L. Schwarz,	1 : 1,680,000	26·5	..	1884
	B. Map of the Island of Saghalien (in Russian),	1 : 1,680,000	26·5	1	1885
	C. " " " " "	1 : 2,100,000	33·1	1	1883
	B. Map of the Ussuri-Territory (in Russian),	1 : 630,000	9·9	1	1883
	* Carte de la Partie Méridionale de la Province Littorale de la Siberia. Dressée en 1883 par M. Venukoff, Dirigée par Mr. L. Drapeyron. Paris: Ch. Delagrave,	1 : 2,500,000	39·4		1883
	C. Ost-Kap nach Aufnahme der Bremer Expedition unter Gebr. Krause. Deutsche Geogr. Blätter,	1 : 300,000	4·7	1	1882
	C. Karte des Süd-östlichen Teiles der Tschuktschen Halbinsel. Deutsche Geogr. Blätter,	1 : 1,500,000	23·6	1	1882
	B. Geological Map of Lake Baikal,	1 : 420,000	6·6	2	1880
CENTRAL ASIA. GENERAL MAPS.	* Russian Central Asia, illustrating the Transcaspian Railway and the journey of the Hon. G. Curzon, M.P. Proceedings of the Royal Geogr. Society,	1 : 5,900,000	93·1	1	1889
	* Central Asia. Edinburgh and London: W. & A. K. Johnston Price 4s. 6d.,	1 : 4,979,779	78·5	1	1886
	* A Travers l'Asie Centrale. Par H. Moser, Paris,	1 : 4,200,000	66·2	1	1885
	C. Map of Central Asia (in Russian),	1 : 4,200,000	66·2	4	1884
	C. Map of part of Central Asia, showing the Russian Possessions and the conterminous countries. London: Intelligence Branch, War Office,	1 : 4,200,000	66·2	1	1882
	* Central Asien. Von Dr. J. Chavanne. Wien: A. Hartleben,	1 : 5,000,000	78·9	1	1880
KHIVA, BOKHARA, AND THE PAMIR.	* *Atlas of the Lower Amu-Daria. By Baron A. Kaulbars,*	..	..	..	1888
	C. Map of Khiva (in Russian),	1 : 1,550,000	24·4	1	1876
	C. Itineraries in Bokhara (in Russian),	1 : 1,680,000	26·5	1	1886
	C. Survey Map of Route in Karateghin and Darwaz, made during the expedition of Dr. Regel. By M. Kossiakoff. Proceedings of the Royal Geographical Society,	1 : 633,600	10·0	1	1886
	C. Itineraries in Karateghin and Darwaz. By M. Kossiakoff (in Russian),	1 : 633,600	10·0	1	1885
	C. Map of the Upper Course of the Amu-Daria (in Russian),	1 : 1,267,200	20·0	1	1885

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Central Asia—*continued.* KHIVA, BOKHARA, AND THE PAMIR.	* The Pamir. Illustrating the Russian Explorations in 1883. Proceedings of the Royal Geogr. Society, . . .	1 : 1,267,200	20·0	1	1884
	C. Das Grenzgebiet von Buchara und Afghanistan (Pamir und Quellen des Oxus), Von Dr. B. Hassenstein. Petermann's Geogr. Mitteilungen, ...	1 : 1,700,000	26·8	1	1884
	C. Albert Regel's Reisen in Darwas. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1 : 1,250,000	19·7	1	1884
	C. Part of Central Asia between the Zarafshan and Amu Daria Rivers, Suppl. Papers, Royal Geogr. Soc., ...	1 : 872,368	13·8	1	1884
	C. Map of the Province of Orenburg, Khiva and Bokhara (in Russian), . . .	1 : 2,100,000	33·1	2½	1883
	C. W. Oschanin's Expedition in Buchara, Karategin, und im nord-westlichen Pamir. Petermann's Geogr. Mitteilungen, ...	1 : 1,000,000	15·7	1	1882
	C. Skassi, Sewerzows Erforschung der östlichen Pamir. Petermann's Geogr. Mitteilungen, ...	1 : 1,000,000	15·7	1	1880
	C. Das Quellgebiet des Oxus. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1 : 2,000,000	31·5	1	1879
	C. Das Pamir Plateau und die angrenzenden Teile des Himalaya, Thian-Schan, Hindu Kusch, etc. Von A. Petermann, Erg. 52. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, .	1 : 2,200,000	34·7	1	1877
TRANSCASPIA. GENERAL MAPS.	C. Karte der Transkaspischen Gebiete und von Nord Chorassan. Von Dr. G. Radde, Dr. Walter und J. M. Konschin. Petermann's Geogr. Mitteilungen, .	1 : 2,000,000	31·5	1	1887
	* *Sketch Map of Trans-Caspia. London: Intelligence Branch, War Office,* . .	1 : 3,168,000	50·0	1	1886
	C. *Map of Transcaspia. (In Russian),* . .	1 : 840,000	13·2	9	1885
	B. Route-Surveys in Transcaspia. (In Russian), ...	1 : 84,000	1·3	27	1872
DISTRICT MAPS.	*B. Chart showing the Bays of Krasnovodsk and Mikhaelofsk with their two Ports, and the Port of Uzun-ada,* . . .	1 : 420,000	6·6	1	1887
	* *London: Intelligence Branch, War Office,*	1 : 84,000	1·3	1	
	* *Map of the Transcaspian Province and Railway, St. Petersburg. (In Russian),*	1 : 2,520,000	39·7	1	1887
	B. South-Eastern part of the Transcaspian Territory. (In Russian), . . .	1 : 1,680,000	26·5	1	1885
	* *Map of South-Western Turkmenia. (M. Lessar.) London: Foreign Office,* . .	1 : 1,680,000	26·5	1	1885
		1 : 840,000	13·2	1	
	C. Maruchak to the Oxus. By Capt. Peacocke. London: Foreign Office, . . .	1 : 506,880	8·0	1	1885
	* *Tracing of a Map of the Akhal Tekke and Merv Oases. By A. Ilyin. London: Intelligence Branch, War Office,* .	1 : 2,520,000	39·7	1	1884
	A. *Oasis of Merv. (In Russian),* . . .	1 : 42,000	0·6	14	1884
	Merv und das Russische Grenzgebiet. Von B. Hassenstein. Petermann's Geogr. Mitteilungen, ...	1 : 2,000,000	31·5	1	1884
	B. Russo-Persian Frontier. Copy of Russian Official Map. London: Intelligence Branch, War Office, ...	1 : 840,000	13·2	1	1883
	* Map of the Tejend Oasis. Merv and Sarakhs to Herat. Proceedings of Royal Geogr. Society, ...	1 : 1,647,360	26	1	1883
		1 : 2,217,600	35	1	
	* *Turkmenia. London: Intelligence Branch, War Office,*	1 : 3,360,000	53·03	1	1882
	C. Map of the Tekke Turkoman Country and adjoining Districts. London: Intelligence Branch, Quartermaster General's Department, ...	1 : 1,013,760	16·0	1	1881
	* Map of the Turcoman Steppes and Northern Khorassan. Proceedings of Royal Geogr. Society, ...	1 : 4,435,200	70·0	1	1879

Country.	Title of Map	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Central Asia—*continued.*					
TURKESTAN.					
GENERAL MAPS.	C. Map of Turkestan Governor-Generalship, Khiva, Bokhara, and Kokand Khanates, with the adjoining parts of Central Asia. By Col. Luiselvo. St. Petersburg: A. Ilyin. (In Russian), . .	1 : 2,100,000	33·1	2	1885
	C. Turkestan and the countries between the British and Russian Dominions in Asia. Dehra Dun: Surveyor-General of India,	1 : 2,027,520	32·0	4	1885
	B. Geological Map of Turkestan. (In Russian),	1 : 1,050,000	16·5	6	1884
	B. Road-Map of Turkestan (In Russian), .	1 : 1,680,000	26·5	16	1881
	B. Map of the Turkestan Military District. (In Russian), ...	1 : 1,680,000 1 : 420,000	26·5 6·6	16 ..	1877 1887
	B. Map of Turkestan. (In Russian), . .	1 : 1,050,000	16·5	6	1873
DISTRICT MAPS.	* Verny (Vernoe) District and Issikul Lake. Proceedings of the Royal Geogr. Soc.,	1 : 2,027,520	32·0	1	1888
	B. Map of part of South-Western District of Samarkand. (In Russian), . . .	1 : 420,000	6·6	1	1887
	B. Map of the Territory of Fergana. (In Russian), ...	1 : 420,000 1 : 840,000	6·6 13·2	9 2	1882
	B. Map of the Chinese Frontier Countries. (In Russian), ...	1 : 210,000	3·3	18	1880
	B. Map of the Territory of the Naryn (Syr Daria). (In Russian), ...	1 : 210,000	3·3	10	1870
	C. Map of the District Semirietchensk. (In Russian), ...	1 : 2,100,000	33·1	1	1867
CAUCASIA.					
GENERAL MAPS.	*B. Map of Caucasia* (10 *verst*). *(In Russian),*	1 : 420,000	6·6	25	1847-89
	B. Road Map of Caucasia. (In Russian), .	1 : 840,000	13·2	9	1858-89
	B. Map of Caucasia and adjacent Countries. (In Russian). (5 *verst*), . . .	1 : 210,000	3·3	76	1864-89
	* *Sketch Map, showing the Administrative Divisions of Caucasia. London: Intelligence Branch, War Office,* . .	1 : 4,118,400	65·0	1	1885
	* *Sketch Map of Transcaucasia. London: Intelligence Branch, War Office,* . .	1 : 2,280,960	36·0	1	1885
	C. Map of Caucasia. (In Russian). . .	1 : 2,100,000	33·1	..	1885
	* Map of Caucasia. (In Russian.) St. Petersburg: Ilyin, ...	1 : 1,680,000	26·5	2	1885
	* *Caucasia. London: Intelligence Branch, War Office,*	1 : 1,520,640	24·0	1	1885
	Ethnographical Map of the Caucasus. By N. R. Scidliz. (In Russian), .	1 : 1,080,000	12·04	1	1880
	C. Map of the Eastern portion of Turkish Armenia and Transcaucasia. London: Intelligence Branch, War Office, . .	1 : 630,600	10·0	1	1877
DISTRICT MAPS.	C. Dych-Tau and the Northern Glaciers of the Central Caucasus, from surveys by MM. Jukoff and Bogdanoff, with additions by Mr. H. Wooley and Mr. D. W. Freshfield. Proceedings of the Royal Geogr. Society, . .	1 : 126,720	2·0	1	1890
	C. Gruppe des Adai-Choch im Zentralen Caucasus. Von Dr. B. Hassenstein. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, . . .	1 : 100,000	1·5	1	1889
	C. Elbruz and Central Caucasus. Proceedings of the Royal Geogr. Society, .	1 : 316,800	5·0	1	1889
	C. The Central Group of the Caucasus. By M. de Dechy, D. W. Freshfield, Dr. W. F. Donkin. Proceedings of the Royal Geogr. Society, . . .	1 : 210,000	3·3	1	1888
	C. Uebersicht von G. Radde's Reiseweg in Transkaukasien. Special Karte des Schah Dach. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 1,250,000	19·7	1	1887
	C. Aus den Dagestanischen Hochalpen vom Schahdagh zum Dulty und Bogos. Von Dr. G. Radde. Petermann's Geogr. Mitteilungen: Ergänzungsheft, No. 85. Gotha: Justus Perthes. Price 4s., ...	1 : 1,250,000 1 : 75,000	19·7 1·18	1 1	1887
	* Talysch und seine Bewohner. Von Dr. G. Radde. Leipzig: F. A. Brockhaus,	1 : 840,000	13·2	1	1886

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Caucasia—*continued.*	A. *Map of the Gouvernement of Tiflis.* (*In Russian*), ...	1 : 42,000	0·6	16	1879-85
	* *Outline Map of the Russo-Turkish Frontier between Karaourgan and the Old Frontier. London: Intelligence Branch, War Office,*	1 : 420,000	6·6	1	1882
	* *Russo-Turkish Frontier in Asia under the Treaty of Berlin. London: Intelligence Branch, War Office,*	1 : 253,440	4·0	1	1888
TURKEY IN ASIA.	* Klein-Asien. (In progress.) Gotha: Justus Perthes, ...	1 : 3,700,000	58·3	1	1891
GENERAL MAPS.	* *Territoriale Untertheilung des Ottomanischen Reiches. London: Intelligence Division, War Office,* . . .	1 : 3,864,960	61·0	1	1889
	C. Asiae Minoris Antiquae. H. Kiepert. Berlin: Dietrich Reimer, . . .	1 : 800,000	12·6	6	1888
	C. Carte Générale des Provinces Européennes et Asiatiques de l'Empire Ottoman. (Sans l'Arabie.) Price 8s. Berlin: Dietrich Reimer, . . .	1 : 3,000,000	47·3	4	1886
	C. Gegenwärtiger Zustand des Strassenbaues in der Asiatischen Türkei. Von H. Kiepert. Zeitschrift der Gesellschaft für Erdkunde zu Berlin. Berlin: Dietrich Reimer, . . .	1 : 4,000,000	63·1	1	1886
	C. Map of Turkey in Asia. (*In Russian*), .	1 : 630,000	9·9	20	1880-85
	C. Nouvelle Carte Générale, des Provinces Asiatiques de l'Empire Ottoman. (Sans l'Arabie.) Par H. Kiepert. Price 10s. Berlin: Dietrich Reimer,	1 : 1,500,000 1 : 4,000,000	23·6 63·1	6 1	1884 1884
	* Klein-Asien. Von E. Mayr. München: E. Mayr, ...	1 : 8,000,000	126·2	1	1883
	C. Orographical Map of Asiatic Turkey. (*In Russian*), ...	1 : 2,100,000	33·1	2	1882
	* Carte Télégraphique de la Turqie d'Asie,	..	..	1	1881
	C. Karte von Armenien, Khurdistan und Azerbeidschan. Von H. Kiepert. Southampton: Ordnance Survey Office, . .	1 : 500,000	7·8	16	1878
	C. Map of Asiatic Turkey, Asia Minor, Armenia & Northern Kurdistan. (*In Russ.*),	1 : 840,000	13·2	7	1878
	C. Map of Asia Minor. Berlin: Prussian General Staff, ...	1 : 380,160	6	..	1870
CYPRUS.	*B. A Trigonometrical Survey of the Island of Cyprus. By Capt. H. H. Kitchener, R.E. London: E. Stanford. Price £3,*	1 : 63,360	1	15	1885
	* Cyprus. London: E. Stanford, . .	1 : 316,800	5	1	1886
	* Dr. E. Oberhummer's Routen auf Cypern. Von H. Kiepert. Zeitschrift d. Gesell. f. Erkunde. Berlin: Dietrich Reimer,	1 : 800,000	12·6	1	1890
ASIA MINOR.	C. Specialkarte vom Westlichen Klein-Asien. Nach seinen eigenen Reisen und nach anderen grösstenteils noch unveröffentlichten Routenaufnahmen bearbeitet. Von H. Kiepert. Berlin: Dietrich Reimer. Price 30s., ...	1 : 250,000	3·9	15	1890
	C. Vertheilung der Vegetationsverhältnisse und des Bodenbaues der Insel Lesbos nach den Beobachtungen von Robert Koldewey und Heinrich Kiepert, .	1 : 210,000	3·3	1	1890
	B. Umgebung der Stadt Mytilini mit Angabe der Localnamen nach. Dr. C. A. Candargy. Von H. Kiepert, . . .	1 : 80,000	1·2	1	1890
	C. Lesbos: Die Küstenlinien nach der an einigen Stellen berichtigten Aufnahme von Cpt. Copeland (1834) das Innere nach den Winkelmessungen und Wegaufnahmen von H. Kiepert und R. Koldewey. Berlin: Dietrich Reimer, ...	1 : 120,000	1·8	1	1890
	C. Dr. O. Puchstein's Routen mit Sester zwischen Euphrat und Tigris, 1882. Berlin: Dietrich Reimer, . . .	1 : 300,000	4·7	1	1889

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Asia Minor—*continued.*	B. Topographische Aufnahmen im Nordwestlichen Klein-Asien. Im Auftrage der Königl. Akademie der Wissenschaften in Berlin ausgeführt von März bis November 1886 und gezeichnet von Rittmeister W. von Diest. Petermann's Geogr. Mitteilungen. Ergänzungsheft 94. Gotha: Justus Perthes,	1 : 400,000	6·3	3	1890
	C. Karte des Nördlichsten Theiles von Syrien nach den Zeichnungen und Reiseberichten von Dr Karl Humann, Dr. O. Puchstein, M. Hartmann, und B. Moritz gezeichnet von H. Kiepert. Berlin: Dietrich Reimer. . . .	1 : 300,000	4·7	2	1890
	C. Griechisches Sprachgebiet im Pontinischen Küstengebirge. Von H. Kiepert. Zeitschrift d. Gesell. f. Erdkunde. Berlin: Dietrich Reimer, . . .	1 : 660,000	10·4	1	1890
	C. District of Olba, part of Celicia Tracheia, Asia Minor. Explored by Mr. Theodore Bent. April 1890. Proceedings of the Royal Geogr. Society, ...	1 : 348,480	5·5	1	1890
	C. Umgegend von Adramyti im nordwestlichen Klein-Asien. Entwurf nach Routen und Winkelmessungen von H. Kiepert und E. Fabricius. Zeitschrift der Gesellschaft fur Erdkunde zu Berlin. Berlin: Dietrich Reimer, .	1 : 200,000	3·1	1	1889
	* Carte du Kurdistan, Géorgie, Arménie, Mésopotamie et Perse Occidentale. Par H. Binder. Paris: H. Binder, .	1 : 4,000,000	63·1	1	1888
	C. Pusht-i-Kuh District. London: Intelligence Branch, War Office, . . .	1 : 950,400	15·0	1	1888
	C. Map of Armenian Cilicia. Rome: Instituto Cartografico Italiano, . .	1 : 1,000,000	15·7	1	1885
	C. Lykia: Nach den Ergebnissen der in den Jahren 1881-82 ausgeführten Oesterreichischen Expeditionen namentlich den Messungen und Zeichnungen der Herrn O. Benndorf. E. Petersen. G. Nieman, F. v. Luschan. E. Löwy, mit Ergänzung durch die Itinerare früherer Reisenden von H. Kiepert. Wien: O. Gerold's Sohn, .	1 : 300,000	4·7	2	1885
	C. Plains of Cilicia and Issus. Proceedings of the Royal Geogr. Society, . .	1 : 696,960	11·1	1	1884
	C. Die Russisch-türkische Grenze in Armenien von 1878. Stebnitzki. Petermann's Geogr. Mitteilungen, . .	1 : 1,200,000	18·9	1	1882
	C. Sketch to illustrate Capt. Stewart's Journey through the Sanjak of Deir. London: Intelligence Branch, War Office, . .	1 : 2,500,000	39·4	1	1881
	C. Sketch Map of Ante Taurus, Giaour Dagh, and part of Taurus Mountains. London: Intelligence Branch, War Office, .	1 : 1,250,000	19·7	1	1881
	C. Karte des Eurymedon und Melasthales in N. bis zum Beischehirsee. Zeitschrift d. Gesellsch. f. Erkunde. Berlin: Dietrich Reimer, . . .	1 : 500,000	7·8	1	1879
		1 : 1,000,000	15·7	1	1879
	B. Croquis Hâtif (5 jours) du Kaza de Zeitoum, vilayet d'Alep. London: Intelligence Branch, Q.-Master General's Dept., ...	1 : 125,600	1·9	1	1879
	C. Cilicia. Par Favre and B. Mandrot. Paris: Bull. Soc. Géog., . . .	1 : 400,000	6·3	1	1878
	C. Specialkarte des Türkischen Armeniens. Von H. Kiepert. Berlin: Dietrich Reimer, ...	1 : 500,000	7·8	1	1877
	B. Petermann, Originalkarte von Sawrieffs Aufnahme des Bin-göl-dagh. Petermann's Geogr. Mitteilungen, . .	1 : 100,000	1·5	1	1877
	* Petermann, Uebersichtskarte von Cerniks Expedition, ...	1 : 7,500,000	118·3	1	

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Asia Minor—*continued.*	C. Petermann, Originalkarte der Euphrat und Tigris-Gebiete von Alexandretta bis Diarbekr und Bagdad im Norden und Osten, ...	1:1,100,000	17·3	1	
	Petermann, Ethnographisch Uebersichtskarte der Cernikschen Expedition, .	1:5,000,000	78·9	1	
	Petermann, Geologische Uebersichtskarte der Cernikschen Expedition, .	1:5,000,000	78·9	1	1876
	B. Alexandretta, Aintab, Bagdad, Kerkuk, Mosul, ...	1:60,000	0·9	1	
	B. Gangamela und Arbela. Erg. No. 44, u. 45. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, . . .	1:400,000	6·3	1	
	* Petermann, Schichtenkarte von Klein-Asien. Petermann's Geogr. Meitteilungen. Gotha: Justus Perthes, .	1:3,700,000	58·3	1	1875
	C. Exploration archéologique de la Galatie et de la Bithynie d'une partie de la Mysie, de la Phrygie de la Cappadoce et du Pont exécuté en 1861 par Georges Perrot, Edmond Guillaume, Jules Delbet. Paris, ...			7	1872
	C. Kiepert, Asie Mineure, Itinéraires de P. de Tchihatcheff. 1847-63. Erg. No. 20 Petermann's Geogr. Meitteilungen. Gotha: Justus Perthes, . . .	1:2,000,000	31·5	1	1867
	C. Originalkarte zu Dr. H. Barth's Reise durch Kleinasien, von Tschikoryk, nach Isoghüd, und von Trapezund nach Tschikoryk. Von A. Petermann, Gotha: Justus Perthes, . . .	1:1,000,000	15·7	2	1860
SYRIA AND MESOPOTAMIA.	C. Das Quellgebiet des östlichen Tigrisarmes. Von Prof. D. J. Wünsch. Petermann's Geogr. Mitteilungen. Gotha: J. Perthes, ...	1:400,000	6·3	1	1889
	B. Surveys of Ancient Babylon, and the surrounding ruins, with part of the rivers Tigris and Euphrates, etc. By Trelauney Saunders, F.R.G.S. London: Edward Stanford, ...	1:148,920	2·3	1	1886
	* Carte de Syrie. Par E. G. Rey. Paris:	1:500,000	7·8	2	1885
	C. Special Karte des östlichen Teiles von Mittel-Syrien. Von Dr. C. Diener. Wien, ...	1:500,000	7·8	1	1885
	C. Die Quelle des Westlichen Tigrisarmes und der See Göllschik. Von J. Wünsch, Mitt. d. K. K. Geogr. Gesell. in Wien,	1:600,000	9·4	1	1885
	C. Die Flussläufe des Könür, Gerschanis und Kelkit. Von J. Wünsch. Mitt. d. K. K. Geogr. Gesell. in Wien, . .	1:450,000	7·1	1	1884
	C. Sachaus Reisen in Syrien und Mesopotamien. Von H. Kiepert. Leipzig: F. A. Brockhaus, ...	1:750,000	11·8	2	1883
	C. Ruinenfelder der Umgegend von Babylon. Von H. Kiepert. Zeitschrift der Gesellschaft für Erdkunde. Berlin: Dietrich Reimer, ...	1:500,000	7·8	1	1883
	C. Freiherrn von Thielmanns Route von Kerbela nach Palmyra im Dec. 1872. Zeitschrift d. Gesellschaft f. Erdkunde. Berlin: Dietrich Reimer, . . .	1:1,500,000	23·6	1	1882
	C. Professor C. Haussknechts Routen im Orient. Von H. Kiepert,— I. und II. Nord-Syrien, Mesopotamien und Süd-Armenien, ...	1:600,000	9·4	2	1882
	III. Kurdistan und Irak, . . .	1:800,000	12·6	1	
	IV. Centrales und Südliches Persien, Berlin: Dietrich Reimer. Price 10s.	1:800,000	12·6	1	
PALESTINE.	C. A Map of Palestine from Surveys conducted for the Committee of the Palestine Exploration Fund and other Sources. London: E. Stanford. Price £2,	1:168,960	2·6	23	1890

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Palestine— *continued.*	C. Handkarte von Palästina. Von Dr. H. Fischer und Prof. H. Guthe. Zeitschrift des Deutschen Palästina Vereins. xiv., ...	1 : 700,000	11·0	1	1890
	C. Palestine, illustrating the Old and New Testaments, according to Palestine Exploration Survey. By John Bartholomew, F.R.G.S. Edinburgh: John Bartholomew & Co., ...	1 : 665,000	10·4	1	1890
	C. Map of Syria and Palestine, lithographed at the American Press. Beirut (in Arabic), ...	1 : 557,500	8·7	1	1889
	C. Karte des Djebel Hauran. Von Dr. H. Fischer. Zeitschrift des Deutschen Palästina Vereins. xiii., . . .	1 : 400,000	6·3	1	1889
	B. Karte des Dscholan. Aufgenommen und gezeichnet von G. Schuhmacher in Haifa 1885. Separatdruck aus Band ix., der Zeitschrift des Deutschen Palästina Vereins, ...	1 : 152,000	2·3	1	1886
	C. Carte de la Palestine, et du Liban. Par L. Thuillier. Paris: Hachette. Price 8s.	1 : 500,000	7·8	1	1885
	* Map of Palestine. Reduced by arrangement with the Committee of the Palestine Exploration Fund; embodying as much of the Great Survey of Western Palestine as the scale allows. By T. B. Johnston. Edinburgh and London: W. & A. K. Johnston. Price 4s. 6d., ...	1 : 714,196	11·2	1	1883
	C. Map of Western Palestine. From Surveys conducted for the Committee of the Palestine Exploration Fund. By Lieutenants C. R. Conder and H. H. Kitchener, R.E. Reduced from the one-inch Map. Price 12s. 6d., .	1 : 168,960	2·6	6	1882
	C. Special Edition, illustrating the Old Testament, the Apocrypha, and Josephus. By Trelawney Saunders, . . .	1 : 168,960	2·6	6	1882
	C. Special Edition, illustrating the New Testament, also the Talmud and Josephus. By Trelawney Saunders, .	1 : 168,960	2·6	6	1882
	C. Carte de la Palestine. Par Victor Guérin, Agrégé et Docteur de lettres; auteur de la Description Géographique, Historique et Archéologique de la Palestine. Paris: En vente à la librairie de la Société Bibliographique. Maurice Jaridien, Directeur. Price 6s. 6d. .	1 : 250,000	3·9	1	1881
	B. Map of Western Palestine. By Lieuts. C. R. Conder, and H. H. Kitchener, R.E. Price £3, 3s., ...	1 : 63,360	1·0	26	1880
	B. Portion of Eastern Palestine, surveyed by Capt. Conder, R.E., and Lieut. Mandell, R.E., in 1881, . . .	1 : 168,960	2·6	1	1881
	B. The Survey of Eastern Palestine, as far as accomplished by Major Conder (in progress), ...				
	B. Map of Eastern Palestine (Surveyed by the Americans). Southampton: Ordnance Survey Office, ...	1 : 63,360	1·0	13	1879
	B. Levée en Galilée, faisant suite à la carte du Liban de l'État-Major Français, exécuté en 1870, par MM. Mieulet et Derrien. Paris: Dépôt de la Guerre, .	1 : 100,000	1·5	1	1873
	C. Carte du Wady Arabah et du lit du Wady el Jeib. Par M. Vignes. Paris: Lemercier, ...	1 : 240,000	3·8	1	1865
	C. Route Map of the Negeb or South Country, and part of the Desert of Et-Tih. By E. Palmer. London: Palestine Exploration Fund, . .	1 : 465,882	7·8	1	..
	C. Carte du Liban. Paris: Dépôt de la Guerre, ...	1 : 200,000	3·1	1	1862

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Palestine—*continued.*	C. *Map of Palestine (in Russian).* St. Petersburg: Russian General Staff, .	1:200,000	3·1	8	1861
	C. Map of the Holy Land. C. W. M. Van de Velde. Gotha: Justus Perthes, .	1:315,000	4·9	1	1858
ARABIA. DISTRICT MAPS.	* The Bahrein Islands. Reduced from the Admiralty Charts; illustrating the Journey of Theodore Bent. Proceedings of Royal Geogr. Society, . .	1:380,160	6·0	1	1890
	C. Die östliche Pilgerstrasse von Mekka nach Medina, nach der Beschreibung des Obesten Muhammed Bey of Satik. Von R. Kiepert. Zeitschrift der Gesellschaft für Erdkunde zu Berlin. Berlin: Dietrich Reimer, ...	1:1,000,000	15·7	1	1890
	C. Provisorische Skizze eines Teiles von Eduard Glasers Reisen in Yemen. Von E. Glaser. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1:500,000	7·8	1	1886
	C. El Yemen meridionale ed il Belad El-Engris second le esplorazioni di Renzo Manzoni dal Settembre 1877 all' Aprile 1880 costr. e dis. G. E. Fritzsche. Rome: Instituto Cartografico Italiano,	1:750,000	11·8	1	1885
	C. Carta Originale delle Yemen, secondo i rilievi di Renzo Manzoni, etc. G. E. Fritzsche. Rome: Instituto Cartografico Italiano, ...	1:1,000,000	15·7	1	1885
	C. A Map of North-Western Arabia and Nejd. By Charles M. Doughty. Proceedings of the Royal Geogr. Society,	1:2,027,520	32·0	1	1884
	C. Itinéraires dans l'Arabie Septentrionale. Par Ch. Huber. Bull. Soc. Géogr. Paris,	1:2,500,000	39·4	1	1884
	C. *Reconnaissance Sketch of a portion of Wady Sudr, Arabia Petraea, made under the direction of Colonel C. Warren for the Lords Commissioners of the Admiralty,* .	1:63,360	1·0	1	1883
	C. *Reconnaissance of Arabia Petraea, made by the Palmer Search Expedition under the direction of Colonel C. Warren. Compiled for the Lords Commissioners of the Admiralty,*	1:633,600	10·0	1	1883
	C. *Map of Parts of Arabia and Persia. Dehra Dun: Trigonometrical Branch, Survey of India,*	1:2,027,520	32·0	2	1883
	C. W. S. & A. Blunts Reisen in Nord-Arabien, Mit Benutzung der Forschungen von Saïd Pascha, Burton, Doughty, etc. Von. B. Hassenstein. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1:5,500,000	86·8	1	1881
	C. Map of Northern and Central Arabia, to illustrate Mr. Blunt's paper, "A Visit to Jebel Shammar." Proceedings of Royal Geogr. Society, . . .	1:3,801,600 1:1,710,720	60·0 27·0	1 1	1880
	C. Map of the Land of Midian. Capt. R. F. Burton. Journal Royal Geogr. Society, ...	1:1,013,760	16·0	1	1879
	C. The Peninsula of Sinai, the Negeb, and Lower Egypt London: Society for Promoting Christian Knowledge, .	1:633,600	10·0	1	1875
	B. Map of South-Western Arabia. London: Topographical Department, War Office,	1:633,600 1:500,000	10·0 7·8	3 3	1874
	A. Ordnance Survey of Mt. Sinai. Ordnance Survey of Mount Serbal. By C. W. Wilson and H. S. Palmer, R.E., .	1:10,560 1:10,560	0·16 0·16	1 1	1870 1870
	B. Ordance Survey of the Peninsula of Sinai. By C. W. Wilson and H. C. Palmer, R.E. Southampton: Ordnance Survey Office, ...	1:633,600 1:126,730	10·0 2·0	1 2	1870 1870
ADEN.	*C. Sketch Map of the country north of Aden. London: Intelligence Branch, War Office,*	1:126,720	2·0	1	1881
	A. Plan of the Peninsula or Cape of Aden. Calcutta: Surveyor-General of India, .	1:7,200	0·1	1	1881

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
PERSIA.					
GENERAL MAPS.	* Iran und Turan. Gotha: Justus Perthes,	1:7,500,000	118·3	1	1891
	* Carte du Kurdistan, Géorgie, Arménie, Mésopotamie et Perse Occidentale (see Turkey in Asia). Paris: H. Binder, .	1:4,000,000	63·1	1	1888
	C. *Map of Persia.* (*In Russian*), . . .	1:840,000	13·2	12	1871-88
	C. *Map of Persia, Afghanistan, and Baluchistan.* (*In Russian*), ...	1:2,100,000	33·1	6	1887
	C. *Map of Persia. London: Intelligence Branch, War Office,* . . .	1:1,013,760	16·0	6	1886
	C. *Map of Persia, showing Routes. London: Intelligence Branch, War Office,* . .	1:3,041,280	48·0	1	1880
	C. *Persia, compiled principally from original authorities by Capt. O. B. C. St. John. London: H.M. Secretary of State for India,*	1:1,013,760	16·0	6	1876
DISTRICT MAPS.	† Lieut. Vaughan's Route through Central Persia, ...	1:3,041,280	48·0	1	1890
	† Across Luristan to Ispahan. To illustrate the paper by Henry Blosse Lynch, ...	1:506,880	8·0	1	1890
	C. The Karun River and Branches. Compiled from the Charts of Col. Chesney, Lieut. Selby, and Capt. Clemens. Proceedings of the Royal Geogr. Society,	1:506,880	8·0	1	1890
	C. Map of Country between Teheran and Kom, showing situation of new lake. Proceedings of Royal Geogr. Society,	1:760,320	12·0	1	1883
	* Map of the Afghan and Persian Border. Compiled from the Survey by the Officers of the Afghan Boundary Commission. Proceedings of the Royal Geogr. Society, ...	1:2,027,520	32·0	1	1886
	C. Map of Badghis Country. Scottish Geogr. Magazine, ...	1:1,500,000	23·6	1	1886
	C. Zur historischen Topographie von Persien. Von Tomaschek. Wien, . . .	1:1,000,000	15·7	1	1885
	† Notes of a Journey from Kaswin to Hamadan. By J. D. Rees. Madras, .	1:760,320	12·0	1	1885
	C. *Map illustrating Colonel Gerard's Journey through Kurdistan. Calcutta: Surveyor-General of India,*	1:1,013,760	16·0	1	1885
	C. Part of Southern Persia, from Shiraz to Jashk, from a Survey by J. R. Preece. Suppl. Papers: Royal Geogr. Society,	1:1,267,200	20·0	1	1885
	C. Map of the North-Eastern Frontiers of Persia, embracing also Khiva and the intervening Deserts. By Col. Baker and Lieut. W. Gill. London: E. Stanford, ...	1:1,900,800	30·0	1	1884
	C. Specialkarte der neuen Russisch-Persischen Grenze. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1:850,000	13·3	1	1884
	† Route von Zendjan nach Tacht i Soleiman. Aufgenommen von General A. Houtum-Schindler, ...	1:506,880	8·0	1	1883
	† Route von Quazwin nach Tabriz. Aufgenommen von General A. Houtum-Schindler, ...	1:1,013,760	16·0	1	1883
	† Route von Tabriz nach Saudjbulagh. Aufgenommen von General A. Houtum-Schindler. Zeitschrift d. Gesellschaft für Erdkunde zu Berlin. Berlin: Dietrich Reimer, ...	1:506,880	8·0	1	1883
	† A Map of a Route along the Alburz Mountains, between Teheran, Astrabad, and Shahrud. By Lieut.-Col. Beresford Lovett, R.E. Proceedings of the Royal Geogr. Society, ...	1:506,880	8·0	1	1883
	† Routes in South-Western Persia. Surveyed in the years 1881 and 1882. By Capt. H. L. Wells, R.E., . . .	1:506,880	8·0	2	1883
	C. *Map of Parts of Arabia and Persia* (*see Arabia*). *Dehra Dun: Surveyor-General of India,*	1:2,027,520	32·0	2	1883

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Persia—*continued.*	*B. Copy of the original MS. Map annexed to the Protocol of the Anglo-Russian Commission for the delimitation of the Territory of Kotour. London: Intelligence Branch, War Office,*	1:73,050	1·15	1	1883
	B. Copy of Map furnished by Russian Minister of Teheran to Persian Government for negotiation of Akhal-Khorassan Boundary Question. London: Intelligence Branch, War Office,	1:420,000	6·6	1	1882
	C. Map of Aderbeijan. By H. Kiepert. Berlin: Dietrich Reimer,	1:800,000	12·6	1	1882
	C. Map of Khorassan and neighbouring Countries. Proceedings of the Royal Geogr. Society,	1:1,457,280	23·0	1	1881
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	† Route Map from Task to Bampur, to accompany the Paper by E. A. Floyer. Proceedings of the Royal Geogr. Society,	1:1,900,800	30·0	1	1879
	† Routen im Nordwestlichen Persien. Routen in Südwestlichen Persien. Von A. Houtum-Schindler. Zeitschrift d. Gesell. f. Erdkunde. Berlin: Dietrich Reimer,	1:600,000 1:600,000	9·4 9·4	1 1	1878 1878
	† *Caravan Route from Tabreez to Kirkmanshab. By Capt. H. G. Napier. London: Intelligence Branch, War Office,*	..	..	1	1878
	C. *Sketch of a Portion of the Upper Atrak Basin. Calcutta: Surveyor-General of India,*	1:253,440	4·0	2	1877
	† Strasse von Semnan nach Meschhed. Von A. Houtum-Schindler. Zeitschrift d. Gesell. f. Erdkunde. Berlin: Dietrich Reimer,	1:600,000	9·4	2	1876
	B. Map of Khuzistan. London: Intelligence Branch, War Office,	1:253,440	4·0	1	1875
	B. Map of the Turco-Persian Frontier. Southampton: Ordnance Survey,	1:253,440	4·0	9	1873
	C. *Route from Teheran to Mushed. By Lieut. Gill. London: Topographical Department, War Office,*	1:1,267,200	20·0	1	1873
	† *Route from Teheran to Herat. London: Topographical Department, War Office,*	1:1,783,000	28·1	1	1857
HANISTAN.	*C. Map of Persia, Afghanistan and Baluchistan (in Russian),*	1:2,100,000	33·1	6	1887
GENERAL MAPS.	* Map of Persia and Afghanistan. Edinburgh and London: W. and A. K. Johnston. Price 4s. 6d.	1:4,311,000	68·03	1	1886
	C. Afghanistan, and adjoining Countries. Calcutta: Surveyor-General of India,	1:3,011,280	48·0	1	1885
	* Map of Afghanistan and adjoining Countries. London: Edward Stanford. Price 1s. 6d.,	1:5,068,800	80·0	1	1885
	C. Map of Afghanistan and neighbouring Countries (in Russian),	1:2,100,000	33·1	2	1885
	C. Karte von Afghanistan mit den angrenzenden Russischen und Englischen Gebieten. Von G. Freytag. Wien: A. Hartleben,	1:2,100,000	33·1	1	1885
	C. Karte von Iran, oestliche Hälftes, enthaltend Afghanistan, Balutchistan und die Ozbeglieschen Khanate am Oxus. V. H. Keipert. Berlin: Dietrich Reimer,	1:3,000,000	47·3	1	1885
	C. General Map of Afghanistan. Calcutta: Surveyor-General of India,	1:253,440	4·0	4	1883
	C. Map of Afghanistan. Dehra Dun: Surveyor-General of India,	1:1,520,640	24·0	2	1883

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Afghanistan—*continued.* DISTRICT MAPS.	C. *General Sketch Afghan Boundary, etc.,*	1 : 1,013,760	16·0	1	1887
	C. Spezialkarte der Russisch.-Afghanischen Grenzgebiete. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 1,250,000	19·7	1	1887
	* *Skeleton Map of the Afghanistan and Punjab Frontier,*	1 : 2,027,520	32·0	1	1886
	C. Sketch Map of M. Lessar's explorations with frontier proposed by Russia marked in red. London: Edward Stanford,	1 : 840,000	13·2	1	1885
	C. The Heri Rud and Murghab Rivers, and intermediate Territory from Merv to Herat. Compiled from the Survey of the Officers of the Afghan Boundary Commission and the members of the Russian Military Topographical Department. Proc. Roy. Geogr. Soc.,	1 : 840,000	13·2	1	1885
	B. Military Reconnaissance Sketch from Akarchushmi to Zulfagar. St. Petersburg: Ilyin's Military Topographical Department,	1 : 42,000	0·6	1	1885
	B. Sketch by the Afghan Boundary Commission showing disputed Persian Territory west of the Hari Rud, between Gherian and Herat Pass. Foreign Office. London: Edward Stanford,	1 : 253,440	4·0	1	1885
	C. Compilation from Surveys by Officers of the Afghan Boundary Commission, showing country between the Hari Rud and Murghab Rivers, and including a reconnaissance to the Oxus River. By Capt. Peacocke, R.E. London: Edward Stanford,	1 : 506,880	8·0	2	1885
	C. Map of South-Eastern part of Afghanistan, illustrating Lieut. Broadfoot's Journey from Ghazni to Dera Ismail Khan. Suppl. Papers: Proceedings of the Royal Geogr. Society.	1 : 887,040	14·0	1	1885
	* Special Map to elucidate the Russo-Afghan Boundary Question. Edinburgh and London: W. and A. K. Johnston,	1 : 3,484,800	55·0	1	1885
	C. Maps showing the Eastern portion of the proposed Boundary of N.-W. Afghanistan. Foreign Office. London: Edward Stanford,	1 : 506,880 1 : 126,720 1:1,013,760	8·0 2·0 16·0	3	1885
	† Charts of Routes followed by Members of the Afghan Boundary Commission from Kuhsan to Bala Murghab. By Major Holdich, R.E. London: Edward Stanford,	1 : 1,520,640	24·0	1	1885
	B. Map of the Tejend River. By Ilyin. London: Intelligence Branch, War Office,	1 : 210,000	3·3	2	1885
	C. Map of the North-West Frontier of Afghanistan. By Major E. Holdich, R.E. London: Edward Stanford,	1 : 506,880	8·0	2	1885
	C. Map of North-West Afghanistan. London: Intelligence Branch, War Office,	1 : 633,600	10·0	1	1885
	C. Turkestan and the Countries between the British and Russian Dominions in Asia. Dehra Dun: Surveyor-General of India,	1:2,027,520	3·2	4	1885
	Northern Afghanistan,	1 : 633,600	10·0	1	1883
	C. Sketch Map illustrating the explorations of M—— S—— in and around Badakshan. Dehra Dun: Surveyor-General of India,	1 : 760,000	11·9		1882
	C. Part of Southern Afghanistan with the adjoining portion of Baluchistan, embracing the Toba Plateau, the Pishin Valley, Quetta, Sibi, and Kelat, the Marri Bugti Country, the Sulemani Range, and the British Frontier. Calcutta: Surveyor-General of India,	1 : 506,488 1 : 253,440	8·0 4·0	2 4	1882 1881

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Afghanistan—*continued.* DISTRICT MAPS.	*C.* Map of Kafiristan. Proceedings of the Royal Geogr. Society,	1 : 1,013,560	16·0	1	1881
	C. General Map of the Kandahar District. Calcutta: Surveyor-General of India,	1 : 288,000	4·3	1	1882
	B. Map of the Locations of the Waziri Tribes on the British frontier. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1881
	C. Map showing the Sibi and Thal-Chotiali Routes connecting the Khojak with the Indus Valley, also intervening Mari Country. London: Intelligence Branch, War Office,	1 : 506,000	8·0	1	1881
	B. Reconnaissance of portions of the Marri Hills, including the route followed by the Marri Field Force under Brig.-General MacGregor. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1881
	B. Sibi to Quetta and Thall Chotiate to the Pishin Valley. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1880
	B. Quetta to Khelat-i-Ghilzai and Girishk. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1880
	B. Map of Country between Khelat-i-Ghilzai and Ghazni. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1880
	B. Country between Kareg-i-Ata and Panjwai, at the junction of the Arghandab and Dori Rivers. Calcutta: Surveyor-General of India,	1 : 63,360	1·0	1	1880
	B. The Kuram and Khost Valleys. Calcutta: Surveyor-General of India,	1 : 253,440	4·0	1	1880
	C. Map of Kabul and Country round as far as Kohistan, etc. London: Edward Stanford. Price 6s.,	1 : 126,720	2·0	1	1880
	C. Map of the Pishin Valley and Upper Basin of the Lora. Proceedings of the Royal Geogr. Society,	1 : 506,880	8·0	1	1880
	C. Map of the Country between Sindh and Candahar. Proceedings of the Royal Geogr. Society,	1 : 1,520,640	24·0	1	1880
	C. Sketch Map of Country embracing the routes to Kandahar and Girishk, from Ghazni and Jacobabad. London: Intelligence Branch, Quartermaster-General's-Department,	1 : 1,013,760	16·0	1	1880
	C. Map of Country around Kabul and Ghazni, with the routes leading to India. London: Intelligence Branch, Quartermaster General's Department,	1 : 1,253,400	4·0	1	1879
	C. Gordikoff's Route from the Ferry of Patta Hissar to Herat. (In Russian). Tiflis: Topographical Section of Caucasia,	1 : 210,000 1 : 504,000	3·3 7·8	1 1	1880 1878
	C. The Helmund River. Proceedings of the Royal Geogr. Society,	1 : 1,520,640	24·0	1	1879
	C. The Sulimani Mountains of the Afghan Frontier of British India. Based on Major Wilson's Map, collated with other authorities. Proceedings of the Royal Geogr. Society,	1 : 760,320	12·0	1	1879
	The Hindu Kush and Passes between the Kabul and Oxus. Proceedings of the Royal Geogr. Society,	1 : 1,250,640	24·0	1	1879
Baluchistan. GENERAL MAPS.	*C. Map of Persia, Afghanistan and Baluchistan.* See *Persia (in Russian),*	1 : 2,100,000	33·1	6	1887
	C. Unexplored Baluchistan. By Floyer, London,	1 : 3,520,000	55·5	1	1882
	B. Baluchistan Topographical Survey (in Progress),	1 : 253,440	4·0	..	1882
	B. Baluchistan Topographical Survey (in Progress). Calcutta: Surveyor-General of India,	1 : 126,720	2·0	..	1880

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Baluchistan—*continued.*					
GENERAL MAPS.	*C. The Territories of His Highness the Khan of Kelat or Baluchistan, with the adjacent portions of Sindh, the Punjab, Afghanistan, and Persia. Calcutta: Surveyor-General of India,*	1 : 1,013,760	16·0	2	1876
DISTRICT MAPS.	*C. Sketch Map, showing the Arbab Lak route between Upper Sindh and Khozdar Valley. Dehra Dun: Surveyor-General of India,*	1 : 506,880	8·0	1	1882
	C. Map of Sindh and Punjab frontier. Simla: Quarter-Master-General's Department,	1 : 506,880	8·0	1	1879
	C. A part of Baluchistan, with part of Mekran and Perso-Beluch boundery. By Capt. R. Lovett, R.E. London: India Office,	1 : 580,000	9·1	1	1874
	C. Map of Western Baluchistan, etc. By Major P. B. B. St. John, R.E. London: India Office,	1 : 506,880	8·0	1	1873
INDIA.					
	A.B. Revenue Surveys of British Districts and the Topographical Surveys of Native States in India. (See the different Presidencies).	1 : 63,360	1·0	..	1889
	B. The Indian Atlas of the Topographical Surveys of British India. (In Quarter and Full-Sheets). 52 Quarter Sheets from old material. 146 Quarter Sheets from finished survey. 122 Full Sheets are published,	1 : 255,660 instead of 1 : 253,440	4·0	177	1889
GENERAL MAPS.	C. Thacker's Map of India. Compiled from the Ordnance Survey, and corrected to date with complete Index, containing over 10,000 names (Orthography according to Sir W. W. Hunter). By J. G. Bartholomew. Price 7s. 6d. W. Thacker & Co., London, Bombay, and Calcutta,	1 : 4,435,200	70·0	1	1891
	C. An Atlas of twelve Maps of India, illustrating the Mountain and River Systems, the Irrigation, Civil Divisions, Population and Languages, Railways, Roads, Telegraphs, Post Offices, Ports, etc., Military Commands and Posts, Famines, Meteorology, Crops, Forests, and one-inch Surveys. Accompanied with Tables and Notes. By T. Saunders, F.R.G.S. Price £3, 3s. London: E. Stanford,	1 : 4,762,000 1 : 6,969,600	75·0 110·0	11 1	1889 1889
	C. General Map of India,	1 : 2,027,520	32·0	6	1889
	C. India, compiled from the most recent Topographical and Revenue Surveys, based on the great Triangulation,	1 : 4,055,040	64·0	4	1886
	** Skeleton Map of India,*	1 : 4,055,040	64·0	2	1886
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	The Mountains of India,	1 : 6,969,600	110·0	1	1885
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	Map of India, showing Railways open to Traffic, under construction and under Survey. Railway Administration Report,	1 : 6,082,560	96·0	1	1889

[1] All Government Maps are published at the Surveyor-General's Office, Calcutta.
Agent: London, Edward Stanford.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
India—*continued.* RAILWAY MAPS.	*Map of India to illustrate system of Railways,*	1 : 6,082,560	96·0	1	1888
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	Telegraph Map of India,	1 : 2,027,520	32·0	6	1885
	India, showing Missionary Stations,	1 : 4,055,040	64·0	2	1882
	The Church Missionary Atlas. Part II. London: Seeley, Jackson & Co.,	Various	..	10	1887
STATISTICAL MAPS.	*India, showing percentage of cultivated area of Rice,*	1 : 4,055,040	64·0	2	1887
	India, showing percentage of cultivated area of Cotton,	1 : 4,055,040	64·0	2	1887
	India, showing percentage of cultivated area of Wheat,	1 : 4,055,040	64·9	2	1888
	India, showing percentage of cultivated area of Sugar-Cane,	1 : 4,055,040	64·0	2	1887
	India, showing percentage of cultivated area of Indigo,	1 : 4,055,040	64·0	2	1888
	India, showing external Trade Route,	1 : 5,068,800	80·0	1	1889
	,, ,, *Principal Religions,*	1 : 5,068,800	80·0	1	1889
	,, ,, *Distribution of Languages,*	1 : 5,702,400	90·0	1	1889
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	India, with Iron and Coalfields,	1 : 0,220,752	32·0	6	1889
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Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
India—*continued.* DISTRICT MAPS. RAJSHAHYE AND COOCH BEHAR DIVISION.	*B. Bogra* (1 *sheet*), *Dinajepore* (1), *Pubna* (1), *Rajshahye* (1), ...	1 : 506,880	8·0	4	1887
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	B. Garo Hills (4), *Portion of Sylhet*, (11), .	1 : 126,720	2·0	15	1874-86
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	A. Assam Survey of Boundary between the Garo Hills and Mymensing. London: India Office, ...	1 : 31,680	0·5	2	1889
	B. Parts of Lushai, Cachar and Manipur, .	1 : 506,880	8·0	1	1889
	C. Sketch Map of the Lohot Brahmaputra. By Needham. Proceedings of the Royal Geogr. Society, ...	1 : 327,571	5·16	1	1888
	A.B. Assam Province, (*Standard Sheets*). Price 1 R. 8 A., ...	1 : 63,360	1·0	155 publ'hed 86	1889
NORTH-WESTERN PROVINCES AND OUDH. PROVINCIAL MAPS.	*C. North-Western Provinces and Oudh.* Price 8 A., ...	1 : 2,027,520	32·0	1	1885
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	B. Hundes or Narikhorsum and Monyal (*shaded*). Price 3 R. 8 A., . . .	1 : 506,880	8·0	2	1879
	B. Hundes (*Western*) *and Jehri Garhwall* (*shaded*). Price 1 R. 8 A., . . . *Skeleton Maps.*	1 : 126,720	2·0	1	1879
DIVISIONAL MAPS.	*B. Agra* (1 *sheet*), *Allahabad* (3), *Benares* (3), *Jhansi* (1), *Kumaun* (2), *Meerut* (3), *Rohilkhand* (2). Price 1 R. 8 A., 2 R.,	1 : 253,440	4·0	15	1884
DISTRICT MAPS.	*B. Agra* (3), *Aligarh* (4), *Allahabad* (4), *shaded*), *Azamgarh* (4), *Banda* (2, *shaded*), *Bareilly* (2), *Bareilly and Pilibhit* (2), *Benares* (2), *Bijnor* (2, *shaded*), *Budaun* (2), *Bulundshar* (4), *Cawnpore* (4), *Etah* (4), *Etawah* (2), *Farrukhabad* (4), *Fatehpur* (4), *Ghazipur* (1), *Gorakhpur* (4), *Hamirpur* (2, *shaded*), *Jalaun* (4), *Jhansi* (2), *Lalitpur* (2), *Mainpuri* (2), *Meerut* (4), *Moradabad* (2), *Muttra* (4), *Shajehanpur* (2). Price 2 R , . . .	1 : 126, 20	2·0	78	1872-89

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to 1 inch.	Total Number of Sheets.	Date.
India—*continued.*					
DISTRICT MAPS.	*B. Agra* (1, *shaded*), *Ghazipur* (1), *Hamirpur* (1, *shaded*), *Jaunpur* (1), *Jhansi and Lalitpur with Hamirpur* (2), *Moradabad* (1). Price 2 R. 8 A., ...	1 : 253,440	4·0	7	1878-83
	B. Banda (1 *sheet*), *Basti* (1), *Benares* (1), *Bijnor* (1). *Bulandshahr* (1), *Garhwal* (1), *Hamirpur* (1), *Jalaun* (1), *Pilibhit* (1), *Saharanpur* (1), *Shahjahanpur* (1), *Tarai* (1), ...	1 : 506,880	8·0	12	1887
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Sitapur Division.	*B. Hardoi* (1), *Keri* (1), *Sitapur* (1). Price 8 A., ...	1 : 253,440	4·0	3	1878
	B. Gonda (1 *sheet*), *Rae Bareli* (1), . . .	1 : 506,880	8·0	2	1887
	A. Oudh Province. Price 18 R., . . . (*Standard Sheets.*)	1 : 63,360	1·0	52	1871
	A. North-Western Provinces and Oudh, . (*Standard Sheets.*)	1 : 63,360	1·0	221 publish. 162	1885
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	B. Punjab. Price 12 R., ...	1 : 506,880	8·0	8	1883
	C. Punjab Road Map. Price 2 R., . . .	1 : 1,013,760	16·0	2	1880
	C. Punjab Road Map (*shaded*). Price 1 R., .	1 : 1,520,640	24·0	1	1880
	C. Punjab, Western Himalayas, Kashmir and Northern India, with portions of Afghanistan, Baluchistan, etc. Route Map (*shaded*), Price 2 R. 4 A. . . .	1 : 2,027,520	32·0	1	1884
DIVISIONAL MAPS.	*B. Amritsar* (1 *sheet*), *Lahore* (4), *Mooltan* (4). Price 6 R., ...	1 : 253,440	4·0	9	1862-66
DISTRICT MAPS.	*B. Amritsar* (1 *sheet*), *Gurdaspur* (2), *Sialkot* (2). Price 6 R., ...	1 : 126,720	2·0	5	1878-85
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Chamba Native Ste.	*B. Chamba Territory.* Price 2 R., . . .	1 : 126,720	2·0	4	1872
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Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
India—*continued.*					
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Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
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	C. Kashmir Route Map. By Capt. T. G. Montgomery,	1 : 2,027,520	32·0	1	1864
	B. Gilghit and surrounding Country. By Major Tanner,	: 253,440	4·0	1	1880
NEPAL.	*C. Preliminary Map of Nepal and the Countries adjoining to the south-west, and east,*	1 : 1,013,760	16·0	1	1866
SIKKIM.	*C. Independent Sikkim. By Dr. Hooker,*	1 : 253,440	4·0	1	1861
	C. Map of Sikkim. Proceedings of the Royal Geogr. Society,	1 : 633,600	10·0	1	1881

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
India—*continued.* BHUTAN.	*C. Preliminary Map of Bhutan,* . . .	1 : 506,880	8·0	1	1874
	C. Sketch Map to illustrate Colonel Tanner's Memorandum on explorations in Bhutan and Tibet, ...	1 : 760,320	12·0	1	1888
CEYLON.	*B. Itinerary Map of the Island of Ceylon, showing the Principal and Minor Roads. Colombo : Surveyor General's Office,* .	1 : 253,440	4·0	1	1888
	C. Map of the Island of Ceylon. By J. Ferguson. Colombo : J. H. Symonds, .	1 : 760,320	12·0	1	1884
	B. Map of the Island of Ceylon. Colombo : Surveyor-General's Office, . . .	1 : 506,880	8·0	1	1882
	C. Ceylon. London : E. Stanford, . .	1 : 728,640	11·5	1	1882
	C Map of the Island of Ceylon. By A. M. Ferguson. Colombo : A. M. Ferguson,	1 : 506,880	8·0	1	1868
	C. Map of the Hill Country of Ceylon showing the positions of the principal Coffee estates, etc. By A. M. Ferguson. Colombo : A. M. Ferguson, . . .	1 : 190,080	3·0	1	1876
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	A.B. Andaman Survey (In Progress), .	1 : 15,840 1 : 126,720	0·25 2·0	8	1889
	General Map of Port Blair Settlement, .	1 : 253,440 1 : 31,680	4·0 0·5	4 1	1886
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	* Die Centralgruppe der Nicobaren. Von Dr. Svoboda, ...	1 : 370,000	5·8	1	1889
	* Karte von Gross Nicobar. Von Dr. Svoboda. Deutsche Rundschau f. Geogr. und Statistik. Wien : A Hartleben, ...	1 : 370,000	5·8	1	1889
TRANSFRONTIER SURVEY.	*B. North-Western Transfrontier Survey. (In progress),* . .	480 sheets 120 ,, 30 ,, 7½ ,,	1 : 126,720 1 : 253,440 1 : 506,880 1 : 1,013,760	14 4 1 1	1889
	B. Northern Transfrontier Survey. (In progress), . .	368 ,, 92 ,, 23 ,, 5¾ ,,	1 : 126,720 1 : 253,440 1 : 506,880 1 : 1,013,760	Published.	1889
	B. North-Eastern Transfrontier Survey. (In progress), . .	496 ,, 124 ,, 31 ,, 7¾ ,,	1 : 126,720 1 : 253,440 1 : 506,880 1 : 1,013,760	2 29 7 2	1889
	B. South-Eastern Transfrontier Survey. (In Progress). . .	304 ,, 76 ,, 19 ,, 4¾ ,,	1 : 126,720 1 : 253,440 1 : 506,880 1 : 1,013,760	.. 10	1889
CHINESE EMPIRE. GENERAL MAPS.	* Chinesisches Reich. Gotha : Justus Perthes. Price 8d., ...	1:12,500,000	197·2	1	1891
	* China, Korea, und Japan. Gotha : Justus Perthes. Price 8d., . . .	1 : 7,500,000	118·3	1	1890
	C. Atlas von China. Von F. Freiherr von Richthofen. Berlin : Dietrich Reimer,	1 : 750,000	11·8	54	1885
	* Carte de l'Asie Orientale, comprenant l'Empire Chinois, le Japon, les états de l'Inde-Chine et la Malasie. Paris : Andriveau-Goujon. Price 3s., . .	1 : 8,000,000	12·6	3	1885
DISTRICT MAPS.	C. Chinese Turkistan and Northern Tibet, illustrating the journeys of Mr. A. D. Carey and General N. M. Prejevalsky. Suppl. Papers, Royal Geogr. Society. Vol. III. i., ...	1 : 3,801,600	60·0	1	1890
	C. Map to illustrate Paper by Colonel Mark S. Bell, R.E., etc., on the Great Central Asian Trade Route from Peking to Kashgaria. Proc. Roy. Geogr. Soc., .	1 : 8,870,400	140·0	1	1890
	C. Uebersichtskarte von General N. M. Prejevalsky's Reisen in Central Asien. Von Carl Schmidt. Petermann's Geogr. Mitteilungen, ...	1 : 4,500,000	71·0	1	1889

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
China—*continued.* DISTRICT MAPS.	C. Chinesische Provinz Kan-su. Mitteilungen d. Deutschen Gesellschaft f. Ostasien, ...	1 : 4,500,000	71·0	1	1889
	C. Fluss und Wege-Aufnahmen zwischen Hankau und Su-tschou. Im Auftrage des Vicekönigs Zo-Zung-Tang ausgeführt von Hermann Michaelis, Ingenieur 1879-81. Nach dessen Original - Konstructionen. Petermann's Geogr. Mitteilungen. Ergänzungsheft No. 91. Gotha: Justus Perthes, .	1 : 1,000,000	15·7	3	1888
	C. Central Asia from Peking to Yarkhand and Kashmir via the Mustagh Pass. Illustrating the journeys of Lieut. F. E. Younghusband. Proceedings of the Royal Geogr. Society, . . .	1 : 5,448,960	86·0	1	1888
	* Hydrography of South-Eastern Tibet. Proceedings of the Royal Geogr. Soc.,	1 : 4,375,356	67·4	4	1888
	† South-Western China. From Wu-Chau to Tali. By A. R. Colquhoun. Suppl. Paper, Royal Geogr. Society, Vol. II.,	1 : 300,000	4·7	5	1887
	C. Country between the Brahmaputra and Irawadi. Proceedings of the Royal Geogr. Society, ...	1 : 1,077,120	17·0	1	1887
	C. Map of Tibet. Illustrating the journeys of General Prejevalsky. Proceedings of the Royal Geogr. Society, . .	1 : 5,750,000	90·7	1	1887
	C. Map of South-Eastern part of Tibet and adjoining countries. Proceedings of the Royal Geogr. Society, . . .	1 : 5,750,000	90·7	1	1887
	C. Chinese Turkistan and part of Northern Tibet. Proceedings of the Royal Geogr. Society, ...	1 : 3,674,880	58·0	1	1887
	C. Map of Manchuria. Compiled from the latest Russian documents, and information supplied by H. E. M. James, Bombay Civil Service. Proceedings of the Royal Geogr. Society, . .	1 : 4,200,000	66·2	1	1887
	C. Sketch Map of South-Western China. Proceedings of the Royal Geogr. Soc.,	1 : 1,900,800	30·0	1	1886
	C. Frontière du Tibet Oriental. Par M. l'Abbé Desgodines. Nancy: Société de Géographie de l'Est, . . .	1 : 3,000,000	47·3	1	1886
	C. Reiserouten des Indischen Punditen A—— K—— in Gross Tibet, und der Mongolei 1879-82. Zusammengestellt von G. W. E. Atkinson. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1 : 3,000,000	47·3	1	1885
	C. Map illustrating the explorations of Pundit A—— K—— in Great Tibet, 1879-82. Proceedings of the Royal Geogr. Society, ...	1 : 3,674,880	58·0	1	1885
	C. Sketch Map showing the probable course of the Sanpo of Tibet to the Irawadi of Burma. Proceedings of the Royal Geogr. Society, ...	1 : 1,267,200	20·0	1	1885
	A. Canton and the Surrounding Country. By Major Fisher, R.E. Southampton, Ordnance Survey, ...	1 : 10,560	0·16	4	1883
	C. Map of North-Western Mongolia. (In Russian), ...	1 : 2,100,000	33·1	1	1883
	C. Przewalskis Reise durch die Gobi-Wüste und den Kwen-lun nach Tibet und zum Kuku-Nor. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 3,500,000	52·2	1	1883
	C. Karte eines Theiles des Süd-Westlichen China. Von. B. Hassenstein. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1 : 2,000,000	31·5	1	1883
	C. Karte des Tibetanischen und Indo-Chinesischen Grenzgebietes. Von B. Hassenstein. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 3,000,000	47·3	1	1882

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
China—*continued.* DISTRICT MAPS.	C. The Sources of the Irawadi River and its supposed connection with the Sanpo River. Proceedings of the Royal Geogr. Society, ...	1 : 1,267,200	20·0	1	1882
	C. Karte des Tibetanischen und Indochinesischen Grenzgebietes. Von. B. Hassenstein. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, .	1 : 3,000,000	47·3	1	1882
	C. Map of Southern China, showing Mr. A. Colquhoun's Route from Canton to Bhamo. Proceedings of the Royal Geogr. Society, ...	1 : 6,209,280	98·0	1	1882
	C. Route Map of Explorations in Western China. By E. Colborne Baber. Suppl. Papers Royal Geogr. Society, .	1 : 633,600	10·0	3	1882
	C. Partie des Provinces de Kony Tcheou Kouang Si et Yu-nan. Par l'Abbé Creuse. Paris : Bull. Soc. Géogr., .	1 : 1,650,000	26·04	1	1882
	C. Neue Grenze zwischen Russland und China. a. im Ili Gebiet. b. am schwarzen Irtysch. Erg. No. 69. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, . . .	1 : 3,250,000	51·2	2	1882
	C. Karte der Nordwestlichen Mongolei nach den Aufnahmen und Ortsbestimmungen von Potanin u. Rafailow. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, ...	1 : 3,500,000	55·2	1	1881
	C. Aufnahmen im Gebirgslande nordlich und westlich von Peking. Von Dr. O. F. von Möllendorff. Geg. von Dr. R. Kiepert. Zeitschrift d. Gesellschaft f. Erdkunde. Berlin : Dietrich Reimer,	1 : 333,333	5·2	1	1881
	C. Reisen in der Chinesischen Provinz Dschyli. Von Dr. O. F. von Möllendorff. Gez. von Dr. R. Kiepert. Zeitschrift d. Gesellschaft f. Erdkunde. Berlin : Dietrich Reimer, . . .	1 : 1,000,000	15·7	1	1881
	C. Kreitner, Graf Szechenyis Reiseroute von Sayang bis Bamo. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes,	1 : 1,000,000	15·7	1	1881
	* Map of Kuldja District and the Russo-Chinese Frontier in Turkestan. Proceedings of the Royal Geogr. Society,			1	1880
	C. Dr. Albert Regels Reise nach Turfan. Von B. Hassenstein. Petermann's Geogr. Mitt. Gotha : Justus Perthes,	1 : 1,500,000	23·6	1	1881
	C. Sandemann, Reiserouten des indischen Punditen A—a in Gebiete des oberen Irawaddi. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, .	1 : 1,200,000	18·9	1	1881
	C. Karte von einem Theile des Sanpo Flusses in Tibet. Aufgenommen von N-m-g. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, .	1 : 1,600,000	25·2	1	1880
	C. Domann, Karte von Dr. A. Regels Reisen in Zentralasien 1876-79, sowie der Routen von Kuropatkin 1876-77, und Przewalsky 1877. Petermann's Geogr. Mitt. Gotha : Justus Perthes,	1 : 3,000,000	47·3	1	1879
	C. Map of Part of China from the Gulf of Pechili to Jehol. London : Intelligence Branch, War Office, ...	1 : 316,800	5·0	2	1879
	C. Map of Part of North-Western Mongolia. By Rafailoff. (In Russian), . .	1 : 2,100,000	33·1	1	1879
	† Routenkarten. Von Fritsche. Petermann's Geogr. Mitteilungen. Ergänz. H. No. 78. Gotha : Justus Perthes, .	1 : 2,500,000 1 : 1,500,000 1 : 750,000	39·4 23·6 11·8	1 1 1	1878
	C. Nacken, Originalkarte der Provinz Kwang-Tung (Canton) zur Uebersicht der deutschen Missionstationen. Plan der Stadt Kanton. Petermann's Geogr. Mitteilungen. Gotha : Justus Perthes, ...	1 : 1,500,000 1 : 67,500	23·6 1·06	1	1878

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
China—*continued.* DISTRICT MAPS.	C. Przewalskys Reise von Kuldscha über den Thians-schan an den Lob-Nor und Altyn-Tag. 1872-77. Erg. No. 53. Petermann's Geogr. Mitteilungen Gotha: Justus Perthes, . . .	1 : 7,500,000	118·3	1	1878
		1 : 3,000,000	47·3	1	1878
	C. Map illustrating the journey of the Pundit Nain Singh through Great Tibet from Ladakh to Assam. By Capt. H. Trotter. Proceedings of the Royal Geogr. Society, and . . .	1 : 1,969,920	31·08	1	1877
	Dehra Dun: Surveyor General of India,	1 : 1,013,760	16·0	2	1875
	C. Przewalskys Reisen von Peking nach Tibet 1870-73. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 4,500,000	71·0	1	1876
HONG-KONG.	*A. Ordnance Map of Hong Kong. Southampton: Ordnance Survey Office,* . .	1 : 15,840	0·25	4	1845
KOREA.	*C. Map of Korea. (In Russian),* . . .	1 : 1,680,000	26·5	2	1889
	C. Sketch Map of Korea. Proceedings of Royal Geogr. Society, ...	1 : 3,000,000	47·3	1	1886
	C. Geologische Karte von Korea. Sitz. Ber. Akad. d. Wiss., Berlin, . . .	1 : 4,000,000	63·1	1	1886
	C. Corée, par les missionnaires de Corée de la Société des Missions Étrangères. Paris: Lemercier et Cie., . . .	1 : 2,400,000	38·03	1	1886
	C. Korea oder Tscho-Sen der Japaner. Mit Benutzung der neusten Küsten-Aufnahmen gezeichnet nach einer im Jahre 1875 vom Kriegsministerium zu Tokio herausgegebenen Karte, übersetzt von Dr. Ernest Satow, Second Secretary and Japanese Secretary to H. M. Legation at Tokio. Red. von B. Hassenstein. Petermann's Geogr. Mitteil., .	1 : 1,700,000	26·8	1	1883
	C. Map of Corea. Corrected by Mr. Rondo-Makoto, Vice-Director of Study, Imperial Japanese Naval College, Tokio. (Japanese Characters), ...	1 : 2,000,000	31·5	1	1883
	C. Corea, the Hermit Nation. By Griffis, Lon.,	1 : 2,800,000	44·19	1	1882
FORMOSA. GENERAL MAPS.	C. Karte von Formosa. Von Dr. Fr. Ritter von Le Monnier. Wien: A. Hartleben,	1 : 1,500,000	23·6	1	1884
DISTRICT MAPS.	C. Southern Part of Formosa. Proceedings of the Royal Geogr. Society, . .	1 : 487,872	7·7	1	1885
	B. Carte du Nord de Formose. Paris: Dépôt de la Guerre, ...	1 : 200,000	3·1	1	1885
	B. Map of North Formosa. Surveyed and drawn by J. W. Paterson, Chinese Custom Service, Malmö, . . .	1 : 220,000	3·4	1	1884
PESCADORES.	*B. Pescadores Islands. London: Intelligence Branch, War Office,*	1 : 95,040	1·5	1	1885
	* Pescadores Isl. Romanet. de Cailland. Paris, Bull. Soc. Géogr. C. R., . .	1 : 430,000	6·7	1	1885
JAPAN.	C. Atlas von Japan. Sectionen: Riu-Riu Inseln, Nagasaki, Kioto, Tokio, Niigata, Hakodate, Kurilen. Das Japanische Reich. Entworfen und gezeichnet von Bruno Hassenstein. Gotha: Justus Perthes. Price 24s., ...	1 : 1,000,000 1 : 7,500,000	15·7 118·3	8	1887
	B Geological Map of Japan.—Reconnaissance Map (Dai Nippon Yosatzuzu). First Division: North Japan 38°-42° N. L. Second division: Japan between 138° E. L., 38° N. L. In black "and geologically" coloured. Von Dr. E. Naumann,	1 : 400,000	6·3	6	1886,87
	B. Sectional Map (Dai Nippon Kei-isen Kubunzu). Col. VI. (138°-139° E. Lo.) 8 : Shizuoka, 9 : Fuji, 10 : Kofu, 11 : Ueda, 12 : Ngano; Col. XII. (139°-140° E. Lo.) 8 : Tzu, 9 : Yokohama, 10 : Tokio, 11 : Mayebashi, 12 : Nokko; Col. XIII. (140°-141° E. Lo.); 9 : Kazusa, 10 : Chiba, 11 : Mito in black and (with the exception of Nikko) geologically coloured. With letterpress in Japanese language, ...	1 : 200,000	3·1	..	1884,88

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date
Japan—*continued.*	*B. Agronomic Map. Kai, with letterpress by Prof. Dr. Pesca. East Shimotsuke. Sagami and South Musashi. The last two are accompanied by letterpress in Japanese language. Tokio: Imperial Japanese Geological Survey,*	1 : 100,000	1·5	..	1887,88
	* *Sketch Map of Japan. London: Intelligence Branch, War Office,*	1 : 6,198,300	97·8	1	1886
	C. Map of Central Japan, showing the route for the Main Trunk Lines of Railway between Tokio, Kioto, and North Coast. London: Foreign Office,	1 : 1,520,640	24·0	1	1885
	C. Die Liu-kiu Inseln. Von Müller Beeck. Zeitschrift d. Gesell. f. Erdkunde,	1 : 3,100,000	48·9	1	1884
	C. Karte von Jeso. Im fernen Osten,	1 : 1,250,000	19·7	1	1882
	C. Rein, Japan Natur und Volk des Mikado Reiches. Bd. I. Mit Karte von Japan,	1 : 2,930,000	46·3	2	1880
	C. Stanford's library map of Japan, principally compiled from Japanese documents. By E. Knipping. London: E. Stanford,	1 : 1,115,800	17·6	6	1880
BURMA. GENERAL MAPS.	*C. Map of Burma and adjacent Countries,*	1 : 2,027,520	32·0	2 pub.	1890
	B. Map of Lower Burma,	1 : 506,880	8·0	1	1889
	C. Burma. Edinburgh and London: W. and A. K. Johnston. Price 15s.,	1 : 950,400	15·0	3	1889
	B. Preliminary Map of Upper Burma,	1 : 506,880	8·0	3	1888
	C. Preliminary Map of Upper Burma,	1 : 1,013,760	16·0	1	1887
	A. British Burma Survey. In progress,	1 : 15,840 1 : 31,680 1 : 63,360	0·25 0·5 1·0	..	1886
	C. Burma with parts of India, China, and Siam. Compiled from the latest Surveys. By J. S. Bryre. Proceedings of the Royal Geogr. Society,	1 : 3,674,880	58·0	1	1886
	C. Map of Burmah. London: E. Stanford,	1 : 1,774,080	28·0	1	1886
	C. Map of Burmah. London: Intelligence Branch, War Office,	1 : 1,013,760	16·0	2	1885
	C. Eastern Bengal, Assam, Burmah and parts of China and Siam. Calcutta Surveyor General of India,	1 : 2,027,520	32·0	4	1885
	C. Monthly Distribution Map of Troops. Dehra Dun: Quarter-Master-General's Dep., Intelligence Branch,	1 : 1,013,760	16·0	1	1886-90
	C. Sketch Map showing the Forest of British Burmah,	1 : 1,013,760	16·0	1	1875
DISTRICT	C. The Chindwin River, Upper Burma. Proceedings of Royal Geogr. Society,	1 : 1,013,760	16·0	1	1889
	B. Lushai and adjoining Hill Tracts,	1 : 506,880	8·0	1	1889
	B. Country adjoining Chittagong Hill Tracts embracing the Field of the Operations of the Right Column Lushai Expeditionary Force, 1871-72,	1 : 253,440	4·0	1	1889
	B. Preliminary Map of Karenni (Upper Burma),	1 : 253,440	4·0	1	1889
	B. Preliminary Map of Chin Hills (Upper Burma),	1 : 253,440	4·0	1	1889
	B. Preliminary Map of Bhamo District (Upper Burma),	1 : 253,440	4·0	1	1889
	A. Ruby Mines,	1 : 10,560 1 : 31,680	0·16 0·5	3 2	1889 1889
	B. Chart of Triangulation, Kubo and Chindwin Valleys,	1 : 508,880	8·0	2	1889
	B. District Akyab,	1 : 506,880	8·0	1	1889
	B. Map showing routes to Haka and Tashon Countries and a route towards Demagiri. By F. Bianconi et Louis de Belestrier. Paris: Chaix,	1 : 506,880	8·0	1	1889
	B. Plan of the Ruby-Mine District of Burma. By R. Gordon. Proceedings of the Royal Geogr. Society,	1 : 63,360	1·0	1	1888
	C. Parts of Burma, Siam and the Shan States, illustrating the explorations of Holt S. Hallett. Proc. R. G. S.,	1 : 887,040	14·0	1	1886

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Burma—*continued.* DISTRICT MAPS.	*C. Northern Burma and Regions adjacent. (In Progress),*	1 : 1,013,760	16·0	..	1886
	C. Map of Part of Burma and Regions adjacent. Calcutta: Intelligence Branch Q.-M. G. Dept.,	1 : 1,013,790	16·0	2	1885
	B. Pegu Division,	1 : 253,440	4·0		1884
SIAM AND CAMBODIA. GENERAL MAPS.	C. Carte de la Cochin-Chine et du Cambodge. Par F. Bianconi (See French Cochin-China). Paris: Chaix,	1 : 1,000,000	15·7	1	1888
	C. Map of the Kingdom of Siam and its Dependencies. Proceedings of the Royal Geogr. Society,	1 : 2,914,560	46·0	1	1888
	C. Carte de l'Indo-Chine Orientale. Par M. Detreuil du Rhins. Paris: Dépôt des Cartes et Plans de la Marine,	1 : 900,000 1 : 1,458,000	14·2 23·01	4 1	1881-89 1886
	C. Carte da la Mission au Laos. Paris: Bull. Soc. Géogr. Commerciale,	1 : 900,000	14·2	1	1890
DISTRICT MAPS.	*B. District of Chiengmai. By J. W. Archer. London: Foreign Office,*	1 : 633,600	10·0	3	1888
	Itinéraire dans le Sud-Ouest de l'Indo-Chine Orientale. Paris,	1 : 450,000	7·1	1	1887
	† *Traverse of the Route from Tavoy to the Boung-te Pass into Siam. By E. A. Kenyon. Calcutta: Foreign Office.*	1 : 9,600	800 ft. to 1 in.	11	1887
	C. Course du fleuve Me Nam. Par R. T. Lombard. Paris: Mission Catholique,	1 : 740,000	11·6	1	1886
	C. Itinéraires de M. A. Pavie dans le Sud-Ouest de l'Indo-Chine Orientale, publiée d'après les ordres de M. C. Thompson. Paris: Challamel,	1 : 500,000	7·8	2	1885
	C. Itinéraires dans l'Indo-Chine. Aux Sources du Don-nai à Binh-thuan et au Sé-Sane. Par le Dr. Neis. Paris: Bull. Soc. de Géogr.,	1 : 1,000,000	15·7	1	1883
	C. Le Cambodge Central. Par E. Aymonier. Paris: Bull. Soc. de Géog.,	1 : 1,800,000	28·4	1	1882
MALAY PENINSULA. GENERAL MAPS.	C. Map of the Malay Peninsula. London: Edward Stanford,	1 : 563,900	8·8	6	1887
	C. Map of the Malay Peninsula. London: Intelligence Branch, War Office,	1 : 950,400	15·0	1	1883
	C. Map of the Malay Peninsula. Proceedings of the Royal Geogr. Society,	1 : 1,210,000	19·2	1	1882
	C. Map of the Malay Peninsula. By Sir W. C. Robinson. London: Straits Settlements Branch of the Royal Asiatic Society,	1 : 484,000	7·6	6	1879
DISTRICT MAPS.	C. Map of Pahang. By Cameron. London: Photographic Company,	1 : 316,800	5·0	1	1889
	B. Survey of a portion of Quantan, London: The Pahang Corporation, Limited,	1 : 126,720	2·0	1	1889
	C. Map of the Territory and Dependencies of Johore. Presented to the Government of South Australia. By His Highness the Sultan of Johore. Adelaide: Surveyor General's Office,	1 : 190,080	3·0	4	1887
	B. Map of Selangor. By F. A. Swettenham, Sketch Map of Perak and adjacent Native States. London: Intelligence Branch, War Office,	1 : 126,720 1 : 950,400	2·0 15·0	1 1	1884 1882
	C. Isthmus of Krah. Drapeyron's Revue de Géogr.,	1 : 444,444	6·9	1	1882
	C. Map of the Northern Part of Perak. From a Survey by Mr. D. D. Daly. Proceedings of the Royal Geogr. Society,	1 : 253,440	4·0	1	1882
	B. D'Sourza's Map of the Malay Peninsula. Singapore: Surveyor-General's Office,	1 : 484,000	7·6	1	1879
	C. Map of part of Malay Peninsula. London: Intelligence Branch, War Office,	1 : 950,400	15·0	1	1876
	B. Map of Singapore Island and its Dependencies. London: Smith, Elder & Co.,	1 : 63,360	1·0	1	1873

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
ANNAM AND TONKIN. GENERAL MAPS.	B. *Carte Provisoire du Tonkin. Dressee à l'Etat-Major de la Division d'Occupation sous la Direction de M. le Commandant Berthaut.* Paris,	1 : 500,000	7·8	4	1890
	C. Carte générale de Tongking. Par Nay. Paris: Challamel,	1 : 1,000,000	15·7	1	1890
	C. Carte du Tonkin et de la frontière de la Chine. Par Bouinais et Schillemans. Paris: Baudoin,	1 : 1,000,000	15·7	1	1889
	C. Carte générale du Tonkin. Dressée par les officiers attachés au service topographique de la Division d'Occupation. Paris: Challamel,	1 : 500,000	7·8	3	1888
	C. Annam et Tonkin. Paris: Andriveaux-Gonjon,	1 : 1,600,000	25·2	1	1888
	C. Carte Commerciale du Tonkin. Par F. Biancoui. Paris: Chaix,	1 : 700,000	11·0	1	1886
	C. *Carte de l'Indo-Chine Orientale. Par. M. Dutreuil de Rhins. Paris: Dépôt des Cartes et Plans de la Marine.* (See Siam and Cambodia),	1 : 1,458,000	23·01	4	1886
	C. *Map of Annam and Cambodia. London: Intelligence Branch, War Office,*	1 : 5,512,320	8·7	1	1885
	B. *Carte du Tonkin. Paris: Dépôt de la Guerre,*	1 : 300,000 1 : 500,000	4·7 7·8	3 1	1885
	B. *Carte du Delta du Tonkin. Paris: Dépôt de la Guerre.*	1 : 300,000	4·7	2	1885
	C. Carte du Tonkin. Par Lieut. M. A. Gouin. Paris: Challamel,	1 : 750,000	11·8	1	1884
	C. Cochin-Chine et Tonkin. Paris: Challamel,	1 : 5,000,000	78·9	1	1883
	C. Uebersichtskarte von Tongking. Von R. Kiepert. Berlin: Dietrich Reimer,	1 : 2,000,000	31·5	1	1883
	C. Karte von Tong-King. Gotha: Justus Perthes,	1 : 1,800,000	28·4	1	1883
	C. *Carte Topographique du Tonkin. Paris: Dépôt des Cartes et Plans de la Marine.*	1 : 1,000,000	15·7	1	1883
	C. Carte du Tonkin. Par M. Mallart-Cressin. Paris: Maison Logerot, J. Gaultier,	1 : 850,000	13·3	1	1883
	C. Carte Administrative et Commerciale des provinces de Binh-Dinh et de Phu-Yen. Par Ch. Lemire. Paris: Bull. d. Soc. d. Géogr. Commerciale,	1 : 400,000	6·1	1	1887
DISTRICT MAPS.	C. *Sketch Map to illustrate the Lang-Son and Red River Operations. London: Intelligence Branch, War Office,*	1 : 600,000	9·4	1	1886
	C. The Northern part of Tong-King, with the Delta of the Song-Coi. Proceedings of the Royal Geogr. Society,	1 : 726,680	11·5	1	1886
	A. Carte des environs de Hanoi. Dressée par le service topographique de l'Etat-Major du corps expéditionaire du Tonkin. Paris: Challamel.	1 : 20,000	0·3	1	1885
	C. Carte du Laos Annamite. Par le Père Blanck,	1 : 1,500,000	23·6	1	1884
	B. Croquis des Rivières Ame et Khao. Par le Père Pirabel. Paris: Bull. Soc. de Géogr.,	1 : 130,000	2·05	1	1884
	C. *Carte des principales voies de communications entre le Tonkin et les provinces méridionales de la Chine. Par Capt. Fournier. Paris: Dépôt de la Guerre,*	1 : 3,700,000	58·3	1	1884
	B. *Song-Koi Delta. London: Intelligence Branch, War Office,*	1 : 506,880	8·0	1	1883
	A. Hanoi, Carte des environs. Par Labarthe,	1 : 50,000	0·7	1	1883
FRENCH COCHIN-CHINA.	C. Carte Politique de l'Indo-Chine. Par François Deloncle,	1 : 3,700,000 1 : 1,800,000	58·3 12·6	1 2	1889 1889
GENERAL MAPS.	C. Carte des Missions Catholiques dans l'Indo-Chine Française. Par A Launay, Paris: Lemercier et Cie.,	1 : 2,000,000	31·5	1	1889
	B. Carte de la Cochin-Chine Française Dressee, etc. Par M. le Commandant A. Koch. Paris: Challamel,	1 : 400,000	6·3	4	1889

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
French Cochin-China—*continued.* GENERAL MAPS.	C. Carte de la Cochin-Chine et du Cambodge. Par F. Bianconi. Paris: Chaix, . . .	1 : 1,000,000	15·7	1	1888
	C. Carte de l'Indo-Chine Orientale. Par M. Detreuil du Rhins. (See *Siam and Cambodia.*) *Paris: Dépôt des Cartes et Plans de la Marine,*	1 : 1,458,000	23·01	4	1886
	C. Conchin-Chine Française. Recerches et reconnaissances. Par Amoitte. Paris: L'Exploration xviii., ...	1 : 310,000	4·73	1	1883
	C. La Cochin-Chine Française. Par M. Bigrel. Paris: Challamel, . . .	1 : 905,510	14·29	1	1882
	B. Carte Générale de la Cochin-Chine Française. Par M. Bigrel, . . .	1 : 127,000	2·0	19	1873
DISTRICT MAPS.	*B. Plan Topographique de l'Arrondissement de Gogong, Bien-Hoa, Buria, Cholon, Vinh Long, Longxuyen, Tra Vinh, Tan An, Soc Trang, Saigon. Paris: Service du Catastre,*	1 : 100,000	1·5	11	1881-9

THE PILCOMAYO EXPEDITION.

(*Communicated by* Mr. J. Barker Duncan, W.S.)

Under the auspices of the Argentine Government, an attempt has been made to explore the Rio Pilcomayo ("Bird River"), a tributary of the river Paraguay, which it meets a little below Asunçion, the capital city of the Paraguayan State. Unfortunately, like some previous expeditions in comparatively recent years in that part of the world, this one too seems to have proved a failure. It will be some time, of course, ere any official report can be issued, but letters to friends in Scotland from Mr. J. Graham Kerr, naturalist to the Expedition, enable some particulars of interest to be given in the meantime.

After protracted preparations during the preceding year, the Expedition seems to have started from Buenos Ayres, under the command of Captain Page, of the Argentine Navy, on New Year's day of 1890. Delays of one kind and another prevented the *Bolivia* (the small steamboat of the Expedition) from entering the Rio Pilcomayo until 12th March. There Mr. Kerr was at once struck with the small, even insignificant, size of the river. It presented itself as a narrow stream, some sixty yards wide, with a current scarcely perceptible, instead of being, as depicted on the maps, a large river. The river was found to be very tortuous. The water being fairly high, comparatively few obstacles to navigation were encountered, and good progress was made until 21st March,

when the Expedition arrived at the point known as "Las Juntes"; thence, upwards for a long distance, the river is divided into two distinct branches. It was decided to follow the "Brazo oriental" or eastern branch. This branch was found to be extremely narrow, much overgrown with trees, and but slow progress was made. Soon the water began to diminish, and it was only by continuous steaming ahead, cutting down trees, lifting up snags, and forcing a way over shallows, that any further progress could be made. About the middle of April, in order to accumulate water to float the *Bolivia* onwards, it was decided to build dams at intervals across the river. By so doing some further progress was made, and by the middle of June latitude 24° 47′ was reached, and then, as the provisions were nearly finished, it was deemed madness to try to go further. Immediate preparations were made to construct a canoe to be sent down-stream for provisions, and it was started off on the 27th of the month. In it went Leon Zorilla, the second officer in command, César, the second engineer, Dr. Vignoli, the surgeon, who was in weak health, and a sailor named Agustin. In the afternoon of the same day the doctor appeared again, having apparently been put ashore from the canoe in the most heartless way, and left to scramble as best as he could back to the *Bolivia*, through infested jungle and thorny thickets. Indeed, he seems never to have recovered the shock, for, though carefully nursed by Mr. Kerr, he died about a couple of months later. Next, Captain Page, finding his health failing, departed down-stream on the 20th July, leaving some seven able-bodied men (including Mr. Kerr) to take care of themselves as best they could until more provisions arrived. Anxiously the small party waited for the return of Zorilla, who had promised to be back with provisions by the 6th August, every day's inaction making the future more anxious and dark. The country around was known to be peopled by treacherous Indians, and the daily rations now served out were just sufficient to keep life together. About September the 18th, the party, thin, weak, and despondent, were visited by Indians. Two chiefs with about a dozen followers showed themselves openly—fortunately, assuring friendship, and, more agreeable still, bringing some large deer and other game. Three days the Indians stayed; on leaving, they promised to come again another moon and to bring their brothers. On October 4th the party got a sudden awakening from the lethargic condition into which, from starvation and despondency, they had fallen, by hearing the distant sound of a bugle-call. They looked at one another, and knew that they were saved. A file of Argentine cavalry appeared almost immediately. They had brought provisions, as a sort of forlorn hope, for the remainder of the expedition had almost been given up as lost. Zorilla, it appeared, had got down the river all right, but, a revolution having just then broken out, instead of returning to his imperilled comrades, he had hurried off to take part in it. Then, too, the survivors learned that Captain Page had died on his way down, and that his men had paddled on for three days and nights without stopping, just managing to get his body on to Puerto Pilcomayo for burial.

From the foregoing brief narrative, the expedition appears to have come to an end; and it seems that nothing now remains but to get the

Bolivia down-river again. Mr. Kerr's last letter, dated "s.s. *Bolivia*, Rio Pilcomayo, lat. 24° 47′ S., long. 58° 40′ W., December 30, 1890," says the party are only waiting for more water to enable them to get the vessel down to the Paraguay; and they expect to be able to accomplish this some time in February of this year.

From its novelty the investigation of the flora and the fauna of the region seems to have been of great interest to Mr. Kerr, although neither flora nor fauna can, he says, be called rich.

"We are here," he writes, "in the midst of the great wilderness 'El Gran Chaco,' about which has always hung such a veil of mystery, due to the utter failure of most expeditions in its exploration, the mysterious disappearance of some, and the bloody massacre of others by the Indians, who have been called 'the fiercest and most treacherous savages on the face of the globe.' I will, therefore, try to give you in a very few words some notion of what the Gran Chaco is, as we find it. Looking around from my present position, I find myself in a typical piece of Chaco scenery: an immense and almost uniformly level plain stretches into the distance on all sides—a plain covered with tall waving grass and thickly studded with tall and slender fan-palms. We are, in fact, in the midst of the immense 'palmar' or palm forest, which extends over almost the entire Chaco, covering thousands upon thousands of square miles. Looking in certain directions nothing is to be seen but an endless vista of the palm trees stretching away until they become dim and hazy in the distance. In other directions, one sees the banks of the winding river marked out by a fringe of green wood; and, if we take horse and penetrate some little distance, we find that the scenery, at first so monotonous, is not without a certain amount of variety. At one point one finds the growth of palms to cease, and we have an apparently gigantic meadow covered with green verdure, and stretching for several miles, undotted by a single palm or tree. Anon one finds oneself in a scene like an English park—an expanse of green turf, dotted with isolated trees and bushes; while, again, one has the range of vision bounded by the sharp and wall-like margin of a belt of dicotyledonous forest. If one penetrates the latter, one finds oneself in a mass of dense and scrubby small trees, while large forest trees occur only occasionally, towering singly far above their fellows. The ground is overgrown with 'Caraguata,' a kind of wild pine-apple, while on the tree trunks one sees perched aroids and Tillandsias and other epiphytes. So much for the general aspect of the Chaco scenery. Animal inhabitants one sees but little of. As in the early morning one passes the margin of a marsh, one may see great marsh deer (*Cervus paludosus*, Desm.) grazing quietly, or by the margin of the forest a troop of peccaries may be seen grubbing in the ground for roots. There are of course many other mammalian inhabitants, but they can scarcely be considered as prominent features in the scenery. Of birds one occasionally sees a troop of tall Rheas go scuttling off in the distance; flocks of parrots fly overhead with shrill screams; while hammering vigorously on a tree trunk may be seen a pair of big woodpeckers with gorgeous pointed cowl of the most vivid scarlet. By night, when all is hushed, when not a breath of air is stirring, and when the stars are shining out like jewels in the clear sky, other bird-inhabitants of the Chaco make themselves known by their voices. The deep and sepulchral 'boo-hoo-hoo' of the great Nacurutú, or Virginian Owl, alternates with the wild shriek of the Ypecahá, the harsh cries of the Charata, and the soft and mournful 'tururu-hoo-hoo' of the Choliba Owl; while, as an accompaniment to all, is the endless concert of crickets and frogs.

"As regards human beings the sole inhabitant of these wilds is the red man, still proud and untamed as when Europeans first landed in America. . . . .

"I do not say this without having some knowledge of what the Indian really is, when pure and uncontaminated by intercourse with the 'Christianos.' I have gone alone amongst them ; I have wandered far from the ship and from my comrades through woods and marshes, accompanied only by half-a-dozen Indians. I have been completely in their power—yet, instead of exhibiting any of the treachery and other evil traits which they commonly get credit for, they behaved like brothers. On these hunting expeditions I was much interested in studying their character, and could not but admire its nobleness as much as I admired the purity and simplicity of their social mechanism. All their good points stood out the more prominently by contrast. . . . .

"Physically these Tobas are a magnificent race : their stature varies much, but a considerable number exceed six feet, and they are beautifully proportioned—somewhat slim, as a rule, rather than stout. They walk erect with light elastic tread ; their head carries a flowing mass of glossy black hair, which curves in front over their forehead as a thick fringe. Of clothing they wear merely a strip of coarse cloth about the middle, while their heads are decorated by ostrich plumes. Of weapons each carries a bow, about 5½ feet in length, and a bundle of arrows with long serrated wooden points. Some also carry short clubs of extremely hard and heavy wood. The women are clothed similarly to the men ; they are small in stature, and are tattooed when they reach puberty. These Indians live entirely by the chase, and are therefore nomadic in their habits. They have scarcely any horses and mules, but are able to cover immense distances on foot."

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Dr. Carl Peters addressed a Meeting of the Society at Edinburgh, in the Queen Street Hall, on Thursday, 5th February. Dr. George Smith, C.I.E., presided. The paper which he read is published this month as our first article. Dr. Robert W. Felkin moved the vote of thanks to the lecturer, and Mr. Ralph Richardson that to the chairman.

Dr. Peters repeated his lecture at a Joint Meeting of the Glasgow Branch of the Society and the Philosophical Society of Glasgow, in the Hall of the latter, on Friday, 6th February. Dr. Thomas Muir presided. On the motion of Mr. John Steven, seconded by the chairman, a vote of thanks was awarded to Dr. Peters.

The Aberdeen Branch of the Society met on Monday evening, the 9th February, in the Music Hall Buildings, in order to hear Dr. Peters' address. Lord Provost Stewart presided over the meeting, and the vote of thanks to the lecturer was moved by Professor Pirie.

The Dundee Branch of the Society held a Meeting on the following evening, in the University College, Mr. Victor Fraenkl presiding, when Dr. Peters repeated his lecture. Principal Peterson moved, and Mr. Weinberg seconded, a vote of thanks to the lecturer.

Dr. Peters was accompanied, on the occasion of his visit, by Lieutenant Borchert, who had been in command of the second column of the German Emin Pacha Relief Expedition.

GEOGRAPHICAL NOTES.

ASIA.

The Southern Ussurian District.—A translation, by Lieutenant-Colonel J. C. Dalton, R.A., of M. Nadarov's article in the *Izvestiya* of the Russian Geographical Society has been published in the form of a Blue-book, and is of great interest in view of the increasing importance of the Amur territory. The South Ussuri district is bounded on the west by the Chinese frontier, which runs, for a distance of 298 miles, from the mouth of the river Tumen-ula to the village of Turi-Rog on the shores of Lake Khanka. From this point the boundary, still following the Chinese frontier, runs across the lake and along the Sungatcha river to the Ussuri. On the north-east the rivers Ussuri, Ulu-khe, Lafudzin, and Avvakumovka, the last flowing into Olga Bay, form the physical (not the administrative) boundary of the country. On the remaining sides the district is washed by the Sea of Japan. The area thus enclosed is about 35,000 square miles, and is, with the exception of a belt stretching from Lake Khanka and the Sungatcha river southwards to the Sikhota Alin chain, clothed with forests, and presents in general an Alpine appearance. It is watered by six rivers flowing into Lake Khanka, eighteen discharging their waters into the Sea of Japan, and the Ussuri, with its tributary the Sungatcha which drains the lake. Of all these only the two last-mentioned and the Suifun, which enters the Sea of Japan, are navigable. Lake Khanka measures 53 miles from north to south and 40 miles from east to west. Its water is so muddy that it cannot be drunk until it has stood for a long time. The lake is now navigable, but there is abundant evidence that its level is falling, and that the river Ussuri also is becoming shallower. The principal islands of the southern Ussuri district are Askold and Putiatin and the archipelago known as Russian Island, all lying in Peter the Great Bay. The harbours are numerous and excellent, the best being that of Vladivostok. This town stands on a peninsula between the Amur and Ussuri Bays. Besides the Golden Horn, on which the town is immediately situated, and which is frozen for three months in the year, three other fine bays exist in the vicinity—the Diomede, Ulysses, and Patroclus, of which the latter is covered, for not longer than two weeks, by a sheet of ice so thin that it can easily be broken through by small steamers. Means of communication are scarce. Up to 1880 there was only one road, from Turi-Rog through Kamen Rybeloff to Nikolsk, a distance of 109 miles, fit for wheeled traffic, but now the total length of such roads amounts to 696 miles. There are also roads between the villages occupied by new settlers, and a few bridle-paths. Two steamers of the Amur Steamship Company ply on Lake Khanka and the Ussuri, each making one voyage weekly from Khabarovka to Kamen Rybeloff and back, a steamer of the Telegraph Department makes occasional trips on the Ussuri and Daubi-khe, and a steamer belonging to a M. Federoff runs twice a week from Razdolny on the Suifun to the mouth of the river and back. In 1889 an expedition of engineers made some very satisfactory investigations for a railway from Vladivostok to the station of Grafskaia on the Middle Ussuri. On the projected line the gradients would not exceed eight per thousand, and the radius of the curves would in no case be less than 700 yards, while the level sections would measure 54 per cent. of the total length.

Sufficient data to judge of the climate are wanting, but, from the few observations that have been made, it would seem that the South Ussurian region may be compared with the provinces of Kursk and Samara. The mean temperature for the year is somewhere about 40° F., the thermometer rising in summer to 50° or

56°, while in winter thirty degrees of frost are registered in some parts. The average yearly rainfall is 14·57 inches at Vladivostok and 29·68 at Olga Bay. The prevailing winds in winter and autumn are the north-west and north, and in summer and spring the south-east. The peculiarity of the climate is due to these winds, which blow almost with the regularity of monsoons, and to the cold currents which flow along the coast. The south-east wind brings great atmospheric dampness, causing frequent fogs, while the north-west is equally productive of dryness.

The population consists of Russians, Chinese, Coreans, Japs, and Orothoons, and amounts to 54,600 souls. The Russians, numbering 35,000, are chiefly engaged in agriculture. The Chinese are concentrated in Vladivostok, Nikolsk, and on the coast of Expedition Bay, and are principally occupied in trade and industries. Since 1886 the immigration of this people has been partially checked by administrative regulations. The Coreans, who, after the Russians, are the most numerous race in the country, are exceedingly lazy, and at the conference at Khabarovka the Russians came to the conclusion that it would be advisable to oust them, gradually and gently, out of the South Ussuri region.

Wheat, rye, barley, and other cereals are grown, the yield naturally depending on the cultivation, in which the Chinese are far more proficient than the Russians. The crops of flax and hemp are particularly fine and of excellent quality. Roots and tobacco thrive in all parts of the country, and horticulture is gradually developing. The peasant immigrant possesses few cattle, and does not understand how to rear them. Of natural products sea-kale is the most important, and there is an insignificant trade in horns, furs, *trepang*, etc. Since 1874, when the Russian naval post was transferred from Nikolsk to Vladivostok, the trade of the latter has rapidly developed, and in 1885 the imports were of the value of £534,968, or nearly five times as much as in 1876. In 1880 the volunteer fleet commenced to make more or less regular voyages, bringing goods from Odessa more quickly and cheaply than they could be carried across Siberia. By the latter route the time of transit from Moscow to Vladivostok was 320 days, whereas by sea from Odessa it is only 65 days, and the cost not much more than one-fourth. To the same fleet is due the colonisation of the South Ussuri, for emigrants travelling through Siberia, wearied with privations and inconveniences, settled down on the Amur, where they found excellent soil and climatic conditions, and could not be persuaded to continue their journey to the Ussuri. Notwithstanding the liberal allotment of land given to colonists (270 acres per family), there are now distributed over this region, besides Cossacks and Coreans, some 16,000 souls. The existing settlements can accommodate as many more, and there is room for 20,000 besides. Colonisation is almost certain to take place along the Sungatcha plains to the Ussuri river, then along this river and its tributaries round to the valley of the Ulu-khe. When the level ground has been occupied, the tide of colonisation will invade the forest lands, and thence advance to the undulating country and hill slopes. (M. Nadarov's article is accompanied by a map of the region described.)

The Dutch Colonies in N.-E. Sumatra.—The Dutch colonies in Sumatra have never received due attention. Of the southern half of Sumatra we know something, owing to the writings of Wallace and Forbes, but since the days of Raffles no further addition to our knowledge with regard to north and east Sumatra has been made. Beyond some vague ideas about Acheenese pirates and an unfinished war between them and the Dutch, we may almost say it is a *terra incognita* for the English, except those who have passed some time on the other side of the Straits, in Singapore or Penang, and even there very little is really known about the

surprising progress of these districts ; and the writer, who has been settled there for some years, ventures to think that a short account may prove interesting to some of his readers. Of Acheen itself little can yet be said. The land is rich, and has many products suited for the European market ; but, until the wearisome guerilla warfare has died out, very little progress can be looked for. People are sometimes apt to judge harshly of the slowness of the Dutch forces in subjugating this country, but the unhealthiness of the climate generally, and especially the ravages of *berri-berri*, have, until now, done more to hinder the conquest of Acheen than the sanguinary robber bands of the Rajah of Tenom or Tunku Omar. To the south-east, however, of Acheen, and just opposite Penang, lies the Residency of the East Coast of Sumatra, and the assistant-residentship Deli, which is the subject of these notes. The so-called "Afdeeling" Deli consists of the Malay sultanates of Deli, Langkat, Serdang, and Asahan. In addition to these there are two or three smaller states, all owning the supremacy of one or other of the above. The country is of diluvial formation, and rises gradually from the coast to a height of 1500 or 2000 feet, where it is bounded by the Battak states of the mountains, which do not acknowledge any subjection to the Dutch, but have a somewhat undefined respect for some of the Malay princes of the coast, who stand themselves under the Dutch government. On the coast the inhabitants are almost all pure Malays, but the farther we recede from the coast the more the race gets mixed, till at about 1000 feet above the sea we come among the heathen Battaks, who have for the most part left their homes in the mountains to seek work or to find, amid the semi-civilisation of the Malays, more peace and rest than is ever possible among their own lawless kinsfolk. The mixed race, having received Mohammedanism from the Malays, consider themselves as belonging to the latter, and no greater insult can be offered to one of them than by calling him a Battak. An occasional conflict still takes place now and then between Malays and Battaks, when the Malays are usually politic enough to put forward the Dutch government as their champion. All the states on the coast were at one time vassals of Acheen, but gradually threw off her yoke and declared themselves independent. During the first half of this century there was a gradual reaction, and they were again falling under her power when Holland interfered, and, driving the Acheenese homewards, fixed a boundary to their influence. Since that time the coast Malays have been dropping peaceably more and more into the hands of Holland, so that now, all along the coast, and especially in Deli, the most civilised portion of the Residency, the sultans have lost almost all power, and are only used as puppets to serve the ends of the Dutch Government. Outwardly, however, they are quite independent, and as long as they behave themselves are allowed a nominal rule over their own subjects, while all Europeans, Chinese, Tamils, and other races are under Dutch jurisdiction. In many ways the Dutch theory of colonial government seems preferable to the English method, and perhaps in no case more than when applied to a suspicious native race like the Malays. They are not civilised by force, as would be done in an English colony ; they are left in the enjoyment of their own customs, habits, and even laws, where the latter are not repugnant to European morals,—in fact, let alone in the fullest sense of the word, till slowly and naturally they begin of themselves to take a liking to European customs and civilisation. The principal port on the coast is Laboean (pronounced Labuan), at the mouth of the Deli River, and, 12 miles farther up, lies Medan, the capital of Deli and seat of the Resident of the East Coast of Sumatra. In Langkat the principal town is Bindgey, now also rising into importance. Serdang can hardly yet be said to have a capital, though the Sultan's residence is at Ranta Pandjang, where a *controleur* is also stationed.

The Residency owes its progress to the tobacco plantations which cover the whole face of the country. The culture was commenced in 1863 by a Mr. Nienhuys, and during the first ten years progressed slowly. Since 1874 or 1875 it has, however, risen, till it now reaches, by the returns of last year, a value of f. 32,500,000, or in round figures £2,700,000.

The jungle is cut in November by Malays or Battaks, and in January the Chinese coolies go into the fields. Each man receives a piece of land averaging about an acre. His first duty is to clear the land by cutting up and burning the wood, the larger stumps being left in the ground. The land must then be hoed up to a depth of 7 to 8 inches, and by the middle of April or beginning of May the young tobacco plants, which have been sown in seed-beds during March, can be planted out. Tobacco takes from sixty-five to eighty days to mature, according to the weather and the height of the plantation above the sea. The higher the plantation the longer it takes to ripen, and in some of the newer districts lying on the spurs of the mountains tobacco requires quite 100 days. During this time, however, there is always work enough for the coolies, as there is perhaps no culture which demands such incessant care as tobacco. During the growth the plants have to be hoed up twice—the first time for a couple of inches, and the second time for a foot; and though each coolie has 1000 to 15,000 plants in his field, every single plant must be examined daily to break off young shoots and destroy the caterpillars, which would otherwise completely ruin the crop. The flower, on appearing, is at once broken off, and the great object to be attained is to drive the whole strength of the plant into a limited number of leaves. When ripe, the top leaf assumes a yellowish colour, and the plants may then be cut and brought into the drying sheds, where they are hung up singly and dried till the leaf has obtained a deep-brown colour and the stem is quite dry. The leaves are then stripped from the plants and tied up in bundles to be sent down to the fermenting shed. Here the tobacco is fermented in large heaps and then sorted by the coolies according to colour, quality and length. Each sort is then separately packed in bales of 160 Dutch pounds, and shipped to Europe. A coolie raises on his field, on an average, about 7 pikols of tobacco, the pikol being equal to 125 Dutch pounds, and if he delivers his tobacco in good condition, may earn in a year 150 to 200 Mexican dollars. The profits of tobacco-planting have been up to now so great that other crops have been neglected, and only lately have a few of the planters, with an eye to the future, tried to introduce coffee and india-rubber. But in this as in everything else the cost of labour makes itself felt, and until some more satisfactory coolie immigration scheme has been arranged, Sumatra cannot compete with Brazil and Java. Sufficient rice for home consumption cannot be produced, and it has to be imported in large quantities from Rangoon and Bangkok. A few nutmegs are exported, and, from Langkat, pepper. Formerly there was a considerable trade in gold-dust in the hands of the Battaks, but they now find the process of washing it too slow, and devote their energies to jungle-cutting and shipbuilding for the planters. Battak ponies are still celebrated, and might well stand beside the best of our Shetlands at home. Large prices are however ruining the breed, as the best are all sold, and those now coming down from the mountain plateaus are much inferior to those brought down some ten years ago.

The Dutch Government makes large profits from the import and export rights in Deli, but until now their finances have been so heavily taxed by the long war in Acheen that Deli has hardly had what it might have claimed for internal requirements. Communication is still very faulty, but the Deli Maatschappij, the largest tobacco-growing concern in Sumatra, has in a very public-spirited way taken the lead in constructing a railway from the coast up to Medan, and

thence to Bindgey in Langkat, while a new line has now been commenced down the coast for a distance of 25 miles, thus bringing all the principal tobacco plantations within reach of the railroad and freeing them from depending for their communications on rivers full of snags and roads impassable in the rainy season.

The European inhabitants of the Residency consist of about 1200, who are almost all concerned in tobacco cultivation. There are also about 20,000 Chinese coolies, principally Amoy and Swatow men, while there is a floating population of a few thousands made up of all the various races of the Eastern Archipelago. Very large returns have been made in some cases by tobacco planters. The Deli Maatschappij and the Arendsburg Maatschappij have on several occasions declared dividends of over 100 per cent.

Deli has for us one great point of interest that, till lately, its whole shipping trade, imports and exports, lay in British hands, one great Liverpool line having almost the monopoly. Last year, however, the North German Lloyd made a great effort to get in, and the competition is still being fought out at very low rates of freight, the English line depending on its old connection and knowledge of the trade, while the German line falls back on its subsidies. Freights in the meantime are less than half what they were two years ago, and the planters are profiting by the occasion. Deli has little competition to fear from outside, unless it be from British North Borneo, and it is still questionable whether the latter land be so well fitted for tobacco cultivation as Deli.

For strangers the country is not interesting. Almost the whole of the magnificent virgin forest formerly standing here has been cut away to make room for plantations, and in its place nothing but the six-foot long *lalang* grass comes up. Wild animals have mostly vanished with the jungle. The elephant and the rhinoceros have sullenly given place to Chinese coolies, and now, except tigers, deer, and wild pigs, there is little game left. The tigers are seldom dangerous, though they occasionally take an ox and often come prowling round the houses by night on the chance of picking up some incautious pariah dog. The smaller animals are more interesting, and include many beautiful and rare specimens, among which may be named the marble-cat, the dwarf-cat, with two other species of tiger-cat, the *Bintwrong*, a curious animal half bear and half polecat, the *Mampelon*, an amphibious animal only found here and in Borneo, the *Galeopithecus*, a flying loris, and many sorts of flying squirrels. The copper pheasant and bushfowl abound near the coast, and farther up the former is replaced by the argus pheasant. Small birds are not numerous, and comprise three sorts of parrakeets, several kinds of fruit-pigeons, and some ground-thrushes.

The *lingua franca* is of course Malay, though hardly so purely spoken as on the Malacca coast. Many of the Chinese coolies never learn it, and this complicates very much the relation between employers and employees, as it is impossible to learn all the various Chinese dialects in use among the coolies.—*Contributed by T. C. Barclay, of Deli.*

AFRICA.

British Consular Jurisdiction in Africa.—In order to meet the new political conditions in Africa arising from the assumption of sovereign powers by the great Chartered Companies, Her Majesty's Government has, according to the *Times*, invested certain British Consular officers with the duties of Commissioners, or responsible local representatives of the Crown. Thus, it is announced that Mr. H. H. Johnston, Her Majesty's Consul at Mozambique, will act as British Commissioner in Nyassa-land ; General Mathews will be the Commissioner for East Africa to reside probably at Taveta (whilst Sir Charles Euan-Smith will continue to hold

his post at Zanzibar, with functions similar to those of the Residents at the courts of the feudatory States of India); and Major Macdonald will continue as British Consul-General to the Cameroons and act as Her Majesty's Commissioner for the Oil Rivers District and the Niger Territories.

The Navigation of the Niger.—M. Caron concludes, from the conditions affecting the height of the water in this river, that it can be navigated between Say and Nyamina for a fortnight only, or a month at most, from about November 15th to December 15th. Under these circumstances the vessel employed must have a speed of ten miles an hour, to traverse the distance of 970 miles between Say and Nyamina within this space of time, as well as to contend against the currents, which, according to Barth, attain a velocity of six miles per hour. The boat must be strongly built, and draw only twenty-four to thirty inches of water, and be amply provided with fuel to run between Kura and Tinsherifen (a distance of about 250 miles), where no wood can be obtained. With such a vessel M. Caron believes that a voyage to Say and back can be accomplished in the year.—*Bull. de la Soc. de Géog. Commerciale du Havre*, Nov.-Dec. 1890.

Togo-land.—In December 1890 Captain Kling, on returning from the coast, journeyed through Kpandu to Salaga, and thence in a north-easterly direction into unexplored country. After a long day's march from his camp near Salaga through dry and desolate country he reached the village of Chammá. Here the scenery changed, and yams, beans, and ground-nuts grew in extensive fields. In the distance clumps of huge monkey breadfruit trees marked the sites of villages, and numerous herds of cattle enlivened the landscape. The next day Captain Kling arrived at Bimbilla, a town of 3000 huts. Many of these are occupied by Hausa traders on their way to the coast, and therefore the number of permanent inhabitants cannot be put down as more than 8000. After leaving this town, Captain Kling crossed the broad, majestic Oti or Mori, which harbours great numbers of hippopotami and wading birds, and in two days came to Naparri, on the highway between Salaga and Fasugu. Though no larger than Bimbilla, being situated on a long hill it appears to contain three times the number of huts. Fertile fields extend up the slopes, and monkey breadfruit trees, with their grotesque, leafless stems, form a strange contrast to the surrounding foliage. This was the most northern point of the journey, and, on leaving the town, Captain Kling journeyed about east-south-east through country abounding in game, both large and small, to the village of Yerrepá, the largest he had met with. The huts, 4000 to 5000 in number, are picturesquely situated on a long elevation, and from among them rise baobabs, tulip-trees, and oil-palms. Herds of fine, smooth-haired cattle graze on the slopes, where bare rocks of porphyry and gneiss and swamp ironstone occasionally crop out. The natives, as at Naparri, did not impress Captain Kling favourably. Their conduct was prompted by mistrust of the reason of his coming and delight at the expectation of presents. At the next village, Vu, the men, to the number of three or four hundred, turned out to stop his further progress, and after a long palaver Captain Kling ascertained that they demanded that he should return to Yarrepa and send the chief of that village to negotiate. The attitude of the people of Vu was the result of distorted reports of the Kebu war. As this village is only one day's march from Fasugu, so that little remained to explore, and time and presents were running out, Captain Kling did not feel disposed to wait the result of negotiations, and, therefore, returning nearly to Bimbilla, made his way southward, through an almost uninhabited and difficult country, to the route between Salaga and Bismarckburg.—*Mitteilungen aus den Deutschen Schutzgebieten*, Bd. vii. Heft 3.

AUSTRALASIA.

British New Guinea.—Our Hon. Corr. Member, Mr. J. P. Thomson, read a paper in December last "On the North-East Coast of British New Guinea, and some of the Adjacent Islands," before the Queensland Branch of the Royal Geographical Society of Australasia. He remarked on the absence of information regarding this coast before the establishment of the British authority in New Guinea, which he accounted for by the fact that this part is less accessible from Australian ports than the south-eastern coast. The mountain ranges, when viewed from a distance, seemed to rise abruptly from the shore, leaving no margin of cultivable land, and the natives bore the reputation of barbarous cannibals. Moreover, the indentations of the coast, such as Goodenough, Collingwood, Dyke Acland, and Holincote Bays, are too exposed to afford safe anchorage for ships in stormy weather. Sir William Macgregor, therefore, could not fail to bring back a large fund of information from his expedition to this coast in July 1890. The Anglo-German boundary is defined on the coast by Mitre Rock, a mass of conglomerate rising upon, or near to, the eighth parallel of south latitude, to a height of 60 feet above the water, with an opening about 12 feet high and 1 yard broad extending through it from north to south. Within a quarter of a mile of this rock Boundary Cape, so named by Sir Peter Scratchley, projects into the sea, a promontory of low forest-clad hills rising to a height of 400 to 500 feet. No natives were discovered until the expedition had advanced as far south as Caution Point, where a large village on the coast is inhabited by a powerful tribe. The men ornament their chins with false beards extending from ear to ear, and decorate their heads with cassowary feathers, shells and fibres, but tattooing seems not to be in fashion among them. The largest tribe met with inhabits a district of hilly ground and sago swamps lying to the south of Boundary Cape, behind which undulating country extends up to the ridges of the Owen Stanley Range. They are unacquainted with the use of iron, and, though friendly disposed towards white men, could not be persuaded to exchange their spears, adzes of jade and basalt, etc., for hardware or other articles. The border of Dyke Acland Bay is occupied by a group of villages to which Sir W. Macgregor gave the name of Oro, but, as it was derived simply from the words used by the local guide on approaching the shore, there is some doubt whether it is a tribal name or not. These villages are situated amidst the forest and grassland sloping down from the Hydrographer's Range, the spurs of which are inhabited by a population of about 3000. At the eastern extremity of Dyke Acland Bay lies Cape Nelson, remarkable for its numerous indentations, some of which, such as Maclaren Harbour and Port Hennessy, so named by Sir W. Macgregor, are excellent havens of refuge for shipping. Within the perimeter of this cape lie two mountains, Mount Trafalgar rising to a height of some 4000 feet, and, to the south of it, Mount Victory, probably 3500 feet high. The latter is an active volcano, for in the early morning steam was observed rising from its two crests and from a ridge at a lower elevation, and as the day advanced the whole top of the mountain became obscured by dense exhalations. Whereas Mount Trafalgar is clothed to its summit with forest, the volcano is precipitous and crowned with masses of bare rock. Another large inlet, Collingwood Bay, lies between Cape Nelson and the next promontory, which terminates in the two headlands, Kibirisi Point and Cape Sebiribiri, or Vogel. On the western shore dwells the Maisina tribe, in villages of inferior construction. The houses hold only one family each, and their roofs project to about three feet from the ground, thus forming verandahs. These natives also are unacquainted with iron

and tobacco, and adorn themselves with the usual ornaments of feathers, shells, and dog's teeth. The country towards the interior is low, and densely covered with forests, in which the *casuarina* is conspicuous. Several villages stud the coast between Kibirisi Point and Cape Sebiribiri, and opposite one of them, named Kapikapi, rise two singular masses of coral, probably eighty feet high, on each of which stand about a dozen houses. These, being stocked with spears and approached by wooden ladders, removable when necessary, are probably used as strongholds. After Cape Sebiribiri Goodenough Bay is reached, stretching to East Cape on Ansell's Peninsula, a district that has gained a sad notoriety from the murder of Captain Ansell and the destruction of the *Star of Peace* in 1888. The head of the bay is interesting from the miniature plateaus, elevated about 800 feet above the sea-level, of which the land is composed, and which have been formed by the soil washed down from the ravines in the background. The climate of this part of New Guinea is probably healthy, but the absence of navigable rivers would prove a great obstacle to the cultivation of suitable lands in the interior, if such should be found. Sir W. Macgregor also visited the Trobriand, Murua (Woodlark), and Nada (Lauchlan) Islands, situated far away to the north and north-east of East Cape, between the parallels of 8° 25′ and 9° 23′ S. lat., and the meridians of 150° 30′ and 153° 40′ E. long. Nada is a group of islets, about nine in number, forming an atoll, with a lagoon seven to twelve fathoms deep, and is inhabited by 169 natives. Murua, to the west of Nada, is about thirty-eight miles long, and possesses a good harbour. The natives have entered the iron age, and have abundance of food, consisting of yams, *taro*, and sweet potatoes. The Trobriand Islands lie to the north-west of Murua. The whole group is of coral formation, and is densely covered with forest, and the fertility of the soil is indicated by the abundance of cultivated food. The natives also catch large quantities of fish. They were very friendly with Sir W. Macgregor's party, and very eager to trade. These islands are so much more important in extent and population than had been reported, that several weeks might be spent in thoroughly exploring them.

GENERAL.

Lands of the Globe available for European Settlement.—The February number of the *Proceedings* of the Royal Geographical Society contains a correction to Mr. Ravenstein's figures which we ourselves reproduced (*v. ante*, p. 97). The population of Asia should be stated at 830,000,000, which would make the world's population 1,467,600,000.

The Rainfall of the Globe.—Mr. William B. Tripp read a paper with this title before the Royal Meteorological Society in May 1890 (*vide Quarterly Journal*, Oct. 1890). He had collected records from all parts of the world, which, for the purposes of tabulation, he divided into four quadrants in each of the Northern and Southern Hemispheres. Thus, Europe and Algeria form the north-west quadrant, and Asia the north-eastern, in the Old World, and similarly divisions are made in the New World and in the Southern Hemisphere. His tables show the wettest and driest years during the time records have been kept at each station, the percentages of the rainfall in these years, the mean at the station being taken as 100, and the lowest and highest percentages, wettest and driest years, in different parts of the world. The magnitude of fall in a single year varied from 160·9 inches at the St. Bernard in 1839 to 3 inches at Sandiego in California in 1863. The percentages of the wettest years varied from 291 at Sandiego and 289 at the St. Bernard to 121 at the Cape of Good Hope stations, and 136 in Great Britain, while those of the driest

years ranged from 76 at the Cape to 32 at Sandiego. Mr. Tripp noticed some years that were peculiarly remarkable, such as 1872, when at nearly all the stations from Upsala in Sweden to the south-western extremity of the Spanish peninsula, a range of 2000 miles, a heavy fall was recorded. Mr. Tripp also proposed a method of determining a cycle by calling the ordinary yearly maxima and minima "extremes of the first order," and the culminating points of these "extremes of the second order," and so on. By this method he seems to think that, were records to be obtained for a long succession of years, some connection might be discovered with the sun-spot periods. It is remarkable that the most recent maximum culminations in Europe should occur about 1838-9 and 1872, at an interval of 33 years corresponding to that of the sun-spot maxima of 1837 and 1870, and that the sun-spot minimum of 1856 should nearly coincide with the period of minimum rainfall, these sun-spot culminations being all of the second order.

MISCELLANEOUS.

The **Ancient Routes across the Pamir** are traced out by Dr. Nicolas Severtzow in the *Bull. de la Soc. de Géographie*, Paris, 3ème Trim., 1890.

The *Deutsche Kolonialzeitung*, December 27, 1890, states that in May 1890 King Mwanga, at the instigation of Dr. Carl Peters and Père Lourdel, proclaimed the **Abolition of Slavery in Uganda.**

The **Peninsula of Kola**, on which a Note was published in the *Scottish Geographical Magazine*, vol. vi. p. 419, is described in detail by Monsieur Charles Rabot in the *Bulletin de la Soc. de Géographie*, 2ème et 3ème Trim., 1890.

A **Board on Geographic Names** has been constituted in the United States, the decisions of which will be binding on all the Executive departments. Lieutenant Glover, the Hydrographer, has been chosen secretary.—*Bulletin of the American Geographical Society*, vol. xxii. No. 3.

Monsieur J. C. Reichenbach, formerly French Resident, has published in the *Bulletin de la Soc. de Géographie*, Paris, 3ème Trim., 1890, a treatise on the **Kingdom of Assinie**, in which he discusses its origin and history, the manners, customs, and religion of its inhabitants, and the fauna and flora of the country.

Mr. Clement L. Wragge, writing to *Nature* (February 5, 1891), announces that he has founded a first-order **Meteorological Station at Numea**, New Caledonia, under the auspices of the Queensland Government. He hopes also to establish stations at Aneiteum or Havana in the New Hebrides, at Tahiti, and at other places in the South Pacific.

MM. Catat and Maistre arrived at Fianarantsoa on September 8th, 1890, after a visit to the **South of Madagascar**, which they explored to Fort Dauphin. They have brought back valuable collections, ethnographical, botanical, and zoological. The country is of remarkable fertility, well-watered, and thickly populated.—*Revue Française*, November 1st, 1890.

In the *Deutsche Geog. Blätter*, Bd. xiii. Heft 3, Herr W. J. Wallraff gives an account of the geographical distribution, commercial importance, etc. of **Alfa**, both the *Stipa tenacissima*, or the Spanish esparto grass, and the allied variety, *Lygeum spartum*, frequently sold under the same name in England and France, though distinguished in Algeria by the designation of *Senrah*.

The *Annalen der Hydrographie*, Heft x., 1890, contains an article by Professor O. Krümmel on the method of ascertaining the **Specific Gravity of Sea-water**, from which the salinity can be deduced, by means of the hydrometer. The varieties of this instrument are described, and the precautions to be taken in using it on board ship, and formulæ of reduction for temperature, etc., are given.

The *Report* of the **Survey Department, New Zealand**, for the year 1889-90, has been issued. During the twelve months ending June 30th 1890, 2572 square miles of country were minor triangulated and partly topographically sketched, and a large extent of land was surveyed for selection. From the head office seventy-five land-sale maps have been issued, and twelve district maps, on the mile-to-an-inch scale.

In the *Bulletin de la Soc. de Géographie*, Paris, 3ème Trim., 1890, Monsieur Coudreau sets forth the claims of France and Brazil respecting the disputed territory lying to the south of **Guiana**. The frontier, as laid down by the French authorities, is formed by the northern branch of the Araguary, the upper course of that river, and a line running at a distance of 124 miles from the Amazons to the Rio Branco, the western boundary.

L'Afrique, November 1890, quoting from the *Mémorial Diplomatique*, states that terrible **anarchy reigns in Kordofan**. Abdullah, the successor of the Mahdi, is shut up in Omdurman, and may at any moment be attacked by the Senusi from El-Obeid. No cultivation, and consequently no commerce, is possible, so that famine prevails through the Sudan. Abdullah's lieutenants are seeking to establish small principalities for themselves.

At a meeting in Berlin of the Geographical Society, Chief-Forester Kessler called attention to the **aste of Timber** in the United States. Not only are large quantities cut down for use, but fires, resulting from carelessness or a desire to clear the land for cultivation, cause great destruction. Herr Kessler made the striking comparison that, while only eleven per cent. of the area of the United States is covered with forests, in Germany twenty-six per cent. is so covered.—*Bulletin of the American Geographical Society*, vol. xxii. No. 3.

Monsieur Pavie, French Consul at Luang Prabang, has discovered that the **Song-ka or Black River** is formed by the union of two streams, the Luma on the right bank and the Papien on the left, which unite at a distance of two days' march above Muong-Thé. The latter receives three tributaries on its right bank. Consequently the sources of the Black River lie much farther to the north-west than was formerly supposed, and the products of China may be brought by this channel down to the French territory.—*Bulletin de la Soc. de Géographie de l'Est*, 3e Trim., 1890.

The *Bulletin of the Museum of Comparative Zoology* at Harvard College, vol. xx. No. 2, contains plates of different varieties of **Coral**, illustrating their comparative growth, accompanied by a note by Professor Agassiz. All the specimens were taken in 1888, from a portion of the cable between Key West and Havana repaired in the summer of 1881 ; so that the time of growth is about seven years. *Orbicella annularis* grew to a thickness of two-and-a-half inches in this interval. *Manicina areolata* also shows a very rapid rate of increase, and *Isophyllia dipsacea* grew still more quickly.

The Hungarian Society of Geography, *Bulletin* No. 7, 1890, makes the following appeal to Geographical writers :—"By the thirty-second article of the law of 1872,

section 1, Old Buda, Buda, and Pest, which up to that time had formed distinct municipalities, were united into one town under the name Budapest. Although eighteen years have elapsed since this union was consummated, it is by no means rare to find, in books, periodicals, and newspapers published abroad, Buda and Pest spoken of as separate towns. We therefore beg geographical authors and editors of periodicals to give henceforth to the capital of Hungary the name of Budapest exclusively, and to retain this name without change, whatever be the language the author employs."

NEW BOOKS.

Primitive Folk: Studies in Comparative Ethnology. By Élie Reclus. "*The Contemporary Science*" Series. Walter Scott. Pp. xiv+339. *Price* 3*s.* 6*d.*

This volume deals chiefly with the Eskimo and their congeners, with the Apaches, and with the aboriginal tribes of India. The references to authorities desirable in such a work are not satisfactory, the writers alone being usually quoted without even the names of their works, and chapter and verse never being given; and this is the more unsatisfactory since, from the author's desire to represent these primitive peoples rather as they were before contact with civilised men than as they are now, his authorities are, naturally, not always the most recent.

M. Reclus wisely desires, as he tells us, "not to lay stress" on the more barbarous and disgusting practices of these tribes. He is scarcely to be congratulated on his success in carrying out this intention, the prominence given to the revolting and disagreeable being, it seems to us, undue, and therefore *pro tanto* misleading. *Aux prises*, apparently, with the views in more general acceptance on government, religion, and social ethics, his explanations of the origins of religion and of society will, to many, seem grotesque and fanciful. His record of habits and customs contains, however, much curious matter, and his reasonings on them, are not unfrequently interesting and suggestive; but their value as a contribution to comparative ethnology is much impaired by the frequent inconsequent digressions, with their irrelevant and offensive references to the Christian religion (and, indeed, to religion generally), arguing a tone of mind hardly compatible with philosophic reasoning.

The author appears to include the Khonds and Ooraons among the Kolarian tribes. They have, hitherto, usually been classed among the Dravidians, and the Kolarians are considered to be remnants of an immigration from the north-east, of a Burmese type. Recent anthropometry, however, denies the fact of such an immigration, at all events into the heart of India, and considers the distinction between Dravidian and Kolarian to be merely linguistic; and we conclude that M. Reclus has adopted these views.

One or two of his minor statements we venture to question; *e.g.* he quotes "Bhils and Poligars" among the predatory tribes; we only know the Poligars as a class of petty chiefs, mainly found in the Hyderabad districts, who gave much trouble to our officers early in the century; they were in no sense a race or tribe. Again, we should doubt that the Eucalyptus is a "sacred tree" among the tribes of the Nilgiris; we must admit, too, that his great "feudal emperor" *Orissa*, the oppressor of these tribes, and a contemporary of Charlemagne, is wholly unknown to us.

Studies, National and International: Being Occasional Lectures delivered in the University of Edinburgh, 1864-1889. By JAMES LORIMER, Professor of Public Law and of the Law of Nature and Nations. Edinburgh: William Green and Sons, 1890.

This volume of Professor Lorimer's occasional lectures will be welcomed by his friends, but they will be not less highly valued by the philosophical historian and the philosophical jurist everywhere. The lectures contained in it formed no part of the Professor's systematic course. As is explained in the prefatory note, "They originated in his custom of spending the first hour of the session, when the attention of the students could not well be concentrated on more special subjects of study, 'in discussing in a popular manner what seemed to be the leading public question or public event of the day.'" The subjects are therefore various, but they derive a certain unity and harmony from the author's mind, which imparts to them their academic tone and their dignified style of treatment. Thus, subjects differing widely from one another, such as the Land Question, the Idea of the Family, the German War of 1866, Politics as a Profession, the Church and the Bar, are co-ordinated by Lorimer's original and suggestive method of treating them,—by his constant effort to reach fundamental principles before attempting to generalise. Unquestionably the high position to which he attained among the philosophical jurists of Europe was mainly due to the thoroughness with which his method was carried out in all his work. Professor Flint contributes a short but appreciative memoir to the volume.

On the Structure and Distribution of Coral Reefs. By CHARLES DARWIN. With an Introduction by JOSEPH W. WILLIAMS. London: Walter Scott, N.D.

Yet another reprint of Darwin's "Coral Reefs," this time forming a volume of the useful and comprehensive "Camelot Series." This edition is chiefly remarkable for the excellence of the introduction and of the map-reproductions. Dr. Williams shows little partisan spirit, and clearly and impartially lays down the views of both contending parties, showing the present position of the question and the opinions held by various high authorities on the subject treated of. It is, without doubt, the most impartial piece of writing that has appeared in this connection since Dr. Murray first formulated his theory. The printing is clear and good, and the diagrams, woodcuts, and maps are all excellently produced. There is no index.

The Student's Geography, Physical and Descriptive, Industrial and Commercial, Political and Social, Etymological and Historical. By GEORGE GILL. With 200 Maps and Diagrams. London: George Gill and Sons, 1890. Pp. 1000. *Price* 4*s*. 6*d*.

Apart from the number of its pages, one might infer from the sub-title of Mr. Gill's *Student's Geography* that it is a very comprehensive book. We do not envy the student on whom is imposed the task of getting it up; but there can be no doubt that when any one has mastered its contents his memory will be a complete storehouse of world-knowledge. In spite of very careful arrangement, aided by the use of varieties of type, both in size and in character, the array of names and figures which nearly every page presents is rather overwhelming. It will be inferred from this, and quite correctly, that Mr. Gill follows the method of the older text-books, and not the scientific method exhibited in the works of Dr. Geikie, Mr. Chisholm, and Dr. Mill. Having said that, we have no hesitation in adding that, of its kind, Mr. Gill's book is an excellent specimen. Its matter is abundant, and its style is terse and pointed, and is lighted up with occasional sparks of

sentiment, as when the author speaks of the trans-Atlantic cables "flashing the whispers of Europe to the ears of America." The specialty of the book is the attention it gives to commercial geography in all its departments and bearings. Under every important country a section is devoted to "Trade with Great Britain." Another good feature of the book is the "Historic Outline" attached to every prominent country. Though too condensed to convey much information, these "outlines" are useful as summaries or reminders. The maps are numerous and practical, but they cannot be commended as specimens of cartography. They are somewhat coarse, and many of them are badly printed. We have found the book generally, though not always, accurate. There is a curious logical inversion in some of the statements. It is said that "Man, being a gregarious animal, must live in societies." That is like saying that the lion, being a carnivorous animal, must feed on flesh. Again, the Saracens (in Spain) are described as "a Moorish tribe." Would it not be more correct to describe the Moors as "a Saracen tribe"? Ample space is allotted to the British Islands. England receives 80 pages, Scotland 20, and Ireland 15; while other 50 pages are devoted to the United Kingdom. Glasgow is described as "the fourth city in the United Kingdom": it claims to be the third. "The north and west coast" of Scotland (treated as one coast) is described as grand and imposing, "especially between Dunnet Head and the Mull of Cantyre," which means, especially the whole of it. The statement is, moreover, inaccurate, for the north coast for thirty miles west from Dunnet Head is low, flat, and smooth. It is equally inaccurate to say that the east coast from St. Abb's Head to Tarbetness "is mostly flat, and often sandy." That is not true of the coast of Haddington, or of that of Kincardine. Neither is it quite correct to place the Trossachs on the banks of Loch Lomond, "and in the neighbourhood of Loch Katrine." These, however, are but slight blemishes. They show how difficult it is for any man to write quite accurately about a region which he has not visited. Mr. Gill has relieved his pages of statistical matter to a large extent by throwing that matter into appendixes. This is convenient both for consultation and for purposes of comparison.

Chambers's Brief Geography of the World. London and Edinburgh: W. and R. Chambers, 1890. Pp. 168. *Price* 1*s.*

Moffat's Geography of the British Empire. London: Moffat and Paige. Pp. 103. *Price* 1*s.*

These books are examples of geographical *pemmican*, which may be useful enough in the Arctic regions of competitive examination, but is not a pleasant form of mental nourishment in more genial climates. In both cases, boiling down and compression are carried to excess. The use of such "cram-books" cannot be good either for education or for geographical science.

Aids in Practical Geology. By Grenville A. J. Cole, Professor of Geology in Royal College of Science for Ireland. London: Charles Griffin and Co., 1891. Pp. 402.

This excellent work is intended as a companion to ordinary geological text-books. Everything required and used by the practical geologist is described in it. A section on blowpipe-work has been inserted as an aid to travellers, whilst a large section has been devoted to rocks and to the ordinary minerals of the earth's crust, since these will always present themselves to the observer during any expedition or in any country. A more useful work for the practical geologist has not appeared in handy form.

Walks near Edinburgh. By Margaret Warrender. Edinburgh: David Douglas, 1890. Pp. 181. *Price* 3*s.* 6*d.*

There is no lack of material for an account of the traditions associated with almost every spot around Edinburgh; and what we look for, and find in this volume, is a discrimination and tact in selecting from the vast stores accumulated during many centuries, and the setting of the selection thus made in due order and in graceful language. Miss Warrender well knows the walks she has undertaken to describe, and handles her theme in a manner that would in itself show how sacred to her are the records of departed persons and past events, without the significant motto, "Haud fast by the past," which appears on the title-page. We venture to think that few, however great their acquaintance with local history may be, can read these pages without acquiring a considerable addition to their knowledge. The illustrations by the authoress are fairly good, the frontispiece being especially worthy of praise. That the volume comes from Mr. Douglas is to say that it is faultless as to mechanical production; and a good index adds to the value of a very dainty addition to the extensive literature dealing with the capital of Scotland.

Scottish Rivers. By Sir Thomas Dick Lauder, Bart. of Fountainhall. Glasgow: Thomas D. Morrison. London: Simpkin, Marshall, Hamilton & Co., 1890. Pp. xii. + 357. *Price* 6*s.*

This is a delightful book, and well deserves being reprinted, for, familiar as it must have been at one time, a new generation will now welcome it as something fresh and novel. It is full of descriptions of scenery and of ancient and modern buildings, with appropriate legends and historical events grouped around each. Nor are character-sketches altogether wanting, and these latter are frequently drawn with as much grace as insight. In fact, little that could be thought of to give interest to the descriptions of the Jordan (Pow Burn), the Tweed, and the Tyne, has been omitted by the author, the whole forming a rich treasury of local lore.

The Vikings in Western Christendom, A.D. 789 to A.D. 888. By C. F. Keary, M.A., F.S.A. With Map and Tables. London: T. Fisher Unwin. 1891. Pp. x + 511.

We have not space in this Geographical Magazine to discuss at a length proportionate to its merits this very praiseworthy contribution to the history of a most important epoch and a most interesting race of men. We must confine ourselves to a few disconnected observations. The book is the first volume of a wide historical work planned by the author—the history of the conflict between Christianity and the Heathendom of the North. The scheme is grand and philosophic, the theme attractive. Yet the idea that forms the underlying foundation is scarcely appropriate to the strictly historical events that Mr. Keary regards as its embodiment. For the Vikings were *not* crusaders of Scandinavian heathendom, except in a very limited and irregular sense, a fact expressly stated by Mr. Keary himself. In other words, he has hung his history upon an idea that has little existence in real fact; and the idea has led him away from his subject. He enters with all too great minuteness of detail into the history of the Frankish kingdoms, narrating events that have no connection whatever with the raids and expeditions of the terrible Northmen. Mr. Keary has made a mistake in regarding the struggles between the Scandinavian sea-rovers and the princes and people of the central and western European countries as one great conflict co-ordinate with that waged by the Christians of South Europe against the Saracen and Arab

invaders, and with that which was carried on by the Christians against the heathen Slav races in the east and south-east. The causes of the Viking raids were social, political and national, rather than religious.

Mr. Keary's conception of history is, however, in all respects sound and just. His principal aim is to give us some idea of what the men, the living, acting men, of those far-distant days were really like. He writes as one who believes they were people who had wills, and passions, and affections, as we have at the present day ; he does not regard them merely as lay figures who made history, who realised ideas, who fought for doctrines. He writes from the *human* standpoint, not from that of the antiquary or the dry-as-dust scholar. And yet his book shows evidences of the widest reading and even of ripe and rare scholarship. The fact is, he writes, apart from his structural plan, with sound judgment and common sense. He has followed the best authorities too, Steenstrup, G. Storm, and others of the new Scandinavian historical school, though we think he is inclined to underrate Munch (cf. note 1, p. 118). The chapter we have read with the greatest pleasure is Chapter v. entitled "Character of the Vikings," a capital survey of the social and public life of the "Phœnicians of the North." We have noticed several minor slips—*e.g.* in the chapter just alluded to "tyrrany" (p. 121), "fillibuster" (143), "Hardanga" (157), "Sögne" (three times, p. 158); the book should be revised again for these things. Mr. Keary is all wrong too in his geography of Lincolnshire. Lindsay, more usually Lindsey, is not the southern (p. 337), but the northern division of the county. Kesteven again is not, as p. 144 implies, a place, but the south-western division of the county. The "marsh country" (p. 246) is not in the south of Lincolnshire, but in the north-east, along the coast southwards from Grimsby. The low-lying tracts in South Lincolnshire are the Fens. The map is not free from errors : the most glaring is that it shows the Zuider Zee as an arm of the sea, which it only became in the 12th century.

British Work in India. By R. Carstairs. Edinburgh and London : William Blackwood and Sons, 1891. Pp. 302. *Price* 6*s.*

This is the production of a thoughtful, independent observer of life in India. He is not an official, and is, therefore, exempt from the bias in favour of existing British institutions which an official position is apt to engender. On the other hand he shows no disposition to misconstrue or misjudge the motives and aims of those who are responsible for the initiation and working of administrative measures. He approaches the problems of administration in a calm, philosophic spirit, describes the social conditions and forces which the administration has to reckon with and to utilise, shows how a disregard of these, however excellent in other respects the motives and objects of the government may be, brings inevitable failure on theoretically laudable schemes, and, with a firm grasp of the conditions and forces that must be taken into account, he indicates the directions in which success in improving the material condition and elevating the character of the people may be expected. Having lived among the people and seen how they are affected by the work of British administration, he judges the results by a very different standard from that of the head of a department or of the Government, who has before him merely written reports and tabular statistics that show quantity of work performed, but can tell little of its quality and of its effect on the people. From his own standpoint the writer is able to show how well-intended schemes, notwithstanding an imposing out-turn of work, have produced harm rather than good, because, having been undertaken on a scale too great for the resources available, the execution has necessarily been intrusted to unqualified and underpaid agents ; how others have failed because they did not connect themselves with nor take

advantage of familiar custom and of hereditary feeling and practice ; how legislation not urgently called for has often, in recent years, by multiplying the points of contact between individuals in their relations to each other and between them and the State, increased the irritations from which the people suffer ; and, most important of all, how much depends on the character of the agents of Government who are in immediate contact with the people, and who are to them the Government, and how imperative it is that only men who can be trusted be selected as agents, but when selected that they be left a reasonable freedom of action, and not be rendered as powerless for good as for evil by being reduced to be mere machines worked by a controlling central bureau. The introductory chapters, which analyse and describe the elements of the problem and deduce the principles by which its solution is to be effected, deserve to be carefully studied by those who are called to take part in Indian administration, or who endeavour to influence the action of English political parties upon it. It is hardly possible to exaggerate their value to those who are tempted to apply a Western standard to peoples whose history, inherited character, and social organisation are so utterly diverse from those of the nation they themselves belong to. The particular reforms proposed have reference chiefly to Lower Bengal, which the author knows most intimately. This is not the place to discuss them, nor need it be attempted. They can be adequately appreciated and criticised only by one who has a thorough knowledge of the special circumstances and requirements of that province, which differ in very important respects from those of other provinces of the Indian Empire. But it may be said that, though specially intended only for the former, the general principles on which they are based are in a measure applicable to all. There may well be, and very probably are, practical difficulties in the way of adopting exactly any of the suggested reforms, but no one with any knowledge of the country would deny that in every department of administration there are room and need for improvement, and the spirit in which the question of reform should be approached, and the principles by which legislators and administrators should be guided, are those which the author has so well stated.

Reisebilder aus Liberia. Band II. : Die Bewohner—Thierwelt. Von J. Büttikofer, Conservator am Zoologischen Reichsmuseum in Leiden. Mit Karten, Lichtdruck- und Chromo-lithographischen Tafeln, nebst zahlreichen Textillustrationen. Leiden : E. J. Brill, 1890. Pp. viii + 510.

We reviewed the first volume of this work in vol. vi. p. 441. The present volume, completing the work, deals with the Liberians, the free, civilised Negroes, with the native Negroes, who still live in a condition of barbarism, and with the zoology of the republic. The first two chapters contain a sober and sensible survey of the history of the State, on the whole impartially written, though the narrative does not reflect the greatest credit upon the British Government, and especially upon men calling themselves British commercial men. Herr Büttikofer's love of truth and anxiety to do injustice to none are evident in his summary of the present state and condition of Liberia. The enthusiasm and energy which characterised the founders of the republic have in the mass of the people been supplanted by feelings of lethargy, indifference, and heedless disregard of the future. The financial position of the republic is the reverse of encouraging. The interest of a loan of £100,000, borrowed in London in 1870 for the space of fifteen years, has never been paid since 1873 ; on the other hand, the Liberian representatives who contracted the loan seem to have been very unjustly treated, if not indeed shamefully robbed (see note, p. 51). Very little, comparatively speaking, has been done to civilise the native races of the Interior. But again, the resources and opportunities

of the republic have been very limited, and the expectations that were formed of the colony were in the first instance pitched too high. If immigration from the United States could be stimulated anew, and if by this means or some other more energy, enterprise, and industry could be awakened, there is no reason why the republic should not get the better of her financial difficulties and start on what might be a prosperous and useful future, for she is not destitute of capable and enlightened men to carry the banner of progress, and guide her destinies with skill and wisdom. One danger there is, however, which, though not at present urgent, will in future become more threatening: the aboriginal natives are on the whole indifferent to Christianity, whilst Islam, of a kind, makes perceptible headway among the tribes of the Interior. We congratulate Herr Büttikofer on having written a most useful and interesting monograph on what ought to be, and we hope may yet be, a bright spot on the Dark Continent. The numerous illustrations, including several full-page reproductions of photographs, enhance the value of the book. By way of supplement or correction to our review of the first volume of this work, it should be added that Dr. Nachtigal's remains were removed from Cape Palmas in 1887, and reinterred in the German colony of Cameroons.

La Traite des Esclaves en Afrique. Brussels: F. Hayes, 1889-90.

A publication in two volumes of the documents collected by the recent Anti-Slavery Conference in Brussels. For those who are interested in the suppression of the Slave Traffic in Africa they will be found invaluable. They contain much that can be found nowhere else in so convenient a form, and are illustrated by a large map.

The British Colonist in North America: A Guide for intending Emigrants. London: Swan Sonnenschein & Co., 1890. Pp. 320. *Price* 2*s.* 6*d.* *and* 3*s.* 6*d.*

The author of this useful little handbook states that he has "no personal interests whatever to serve" in writing it. He strongly advises the "British emigrant who is not infected with republicanism" to give weight to the "superior social advantages the Dominion of Canada offers" as compared with the United States. "In comparing the advantages of the Dominion," he says, "with those of the United States, *education*, in the former, in rural districts, is much superior." As regards *farming*, he maintains that "the average English tenant farmer is a king to his American cousin, both in the style of living and the comfort and neatness of his surroundings." Again, he holds that the American (*i.e.* United States) farmer is "considerably worse off than the English or Canadian farmer." The protection tariff, the exactions of monopolies, trusts, and middlemen, the reckless and exhausting system of farming so long pursued, leaving vast areas of once fruitful lands in a state of depletion, an aggregate production in excess of the home and foreign demands, extravagance in machinery, farming with insufficient capital, and general mismanagement and improvidence—all these have, in the author's opinion, tended to cripple the farmers of the United States, and thrown them hopelessly into the hands of money-lenders. "The money-lenders," he states, "are now the landlords of America." Whilst the author takes this gloomy view of the United States, he seems to forget that land, both in Great Britain and Canada, has been and still is largely mortgaged, and yet, from his own showing, British and Canadian farmers are in a comparatively flourishing condition. Carefully written articles follow on British Columbia, Manitoba, Washington State, Oregon, California, New Mexico, Texas, and North Carolina. The book is totally devoid of those glowing accounts by which so many British emigrants have been misled.

Dictionary of the Language of the Micmac Indians. By Rev. Silas Tertius Rand, D.D., LL.D. Pp. viii × 286. Halifax, N.S.: Nova Scotia Printing Company.

Dr. Rand, who died near the end of 1889, laboured for many years among the Micmacs, an Algonquin tribe inhabiting the maritime provinces of the Dominion of Canada. He was the first to commit their language to writing, and this—the English-Micmac—portion of the dictionary compiled by him has been published with the assistance of a grant from the Dominion Parliament. The Micmacs, who were the first Indians with whom the English came in contact, still number some 3000 or 4000 souls, and their vocabulary has many features of interest. Professor Skeat has already found in it the original of *toboggan*, a word which more recently has come into general use.

French Treaty Rights in Newfoundland: the Case for the Colony, stated by the People's Delegates, Sir J. S. Winter, K.C.M.G., Q.C., P. J. Scott, Q.C., and A. B. Morine, M.L.A. London: P. S. King and Son, 1890.

The title fairly describes the scope of this interesting pamphlet, which contains extracts from the treaties with France, a very full examination of the French rights and claims, a summary of the "lobster question," and a statement of the existing arrangements as to bounties and bait. A useful map accompanies the pamphlet.

Mountaineering in Colorado. By Frederick H. Chapin. Second Edition. London: Sampson Low and Co., 1890.

The devotees of mountaineering, having no new worlds to conquer in Switzerland, have now gone in quest of fresh snows to the Rocky Mountains, which have hitherto been but happy hunting-grounds for the lovers of sport. The principal summits of this vast range considerably outsoar the loftiest pinnacles of the Alps, and may stand comparison with them, whether for the exquisite beauty or the dread magnificence of their scenery. The group of peaks which the author of this work ascended, and has graphically described in its pages, is situated in Northern Colorado, and the centre from which he made his excursions was the picturesque valley of Estes Park, which has an elevation of about 7000 feet above the sea, and lies at no great distance from the Wyoming line of railway, and some seventy miles north-west from Denver. The chief member of the group is Long's Peak, which towers to a height 14,271 feet, and dwarfs with its huge mass all the mountains near it. The other great summits are Mount Hallett, Table Mountain, Mummy Mountain, Ypsilon Peak, Hague's Peak, and Stone's Peak, all of which were ascended. These mountains, rising abruptly from the plains in the North of Colorado, form part of what is called its Front Range, a series which includes towards its southern extremity Pike's Peak, now well known from its being, like our own Ben Nevis, the site of a weather Observatory. Mr. Chapin's pages abound with glowing descriptions of the grandeur of the scenery that opened on his view as he made his toilsome and often perilous way over the precipices and snowfields of these great mountains. He tells us that he carried with him, even to their highest ledges, his camera and plates, and that he was thus able to photograph all the most striking views. Many of these are beautifully reproduced in his work, and add greatly to its interest and value. He has noted one or two points in which he found the Colorado Mountains to differ from those he had ascended in Switzerland. There is always, he says, some easy way of access to the high crest of the Rocky Mountains, though they have generally an inaccessible side, but it is otherwise with some of the difficult Swiss peaks. In another place he remarks that in Switzerland the great precipices are seldom so nearly vertical as they are taken to be.

Thus, the east face of the Matterhorn, which, as seen from Zermatt, appears to be all but vertical, has for its angle one of scarcely more than 40°. On the other hand, the stupendous precipice on Long's Peak, called the Tower, is as vertical in reality as it is in appearance. Another point of difference is, that the Colorado Mountains, notwithstanding their great height, are not covered with perpetual snow, while in Switzerland the perpetual snow-line descends as low as some 8000 or 9000 feet. The hot sun and clear dry air of Colorado sufficiently account for the difference. Mr. Chapin has carefully described the routes by which the various crests he ascended are easiest of access. His work will thus serve as a guide-book to the tourist who may wish to visit the scenes which his pen and camera have so vividly depicted. In an appendix he gives a partial list of the plants growing in Estes Park. The work is altogether an excellent addition to the literature of mountaineering, which is now growing apace.

Mexico. By Susan Hall. "Story of the Nations" Series. London : T. Fisher Unwin. Pp. xx+428. *Price* 5*s.*

The story of Mexico is an exceedingly interesting one, but correspondingly difficult to do full justice to—at least in its earlier epochs. So much fiction mingles on every hand with fact, so much is shadowy and unreal, that it requires not only more than common care to pick out what is authentic, but, to do full justice to what may be held as worth retaining and enlarging upon, much space and no little erudition are necessary. In the narrow compass of a work of this kind too much must not be expected, and, bearing in mind that what we are presented with is a sketch and not a detailed history, the work may be welcomed as a contribution of some value to the story of a region as rich in romance as in natural products. The plan followed has been to represent scenes from the history of Mexico—in short, sharply-defined sketches resembling the successions of pictures cast upon a screen by a magic-lantern. This method has the advantage of strongly appealing to the imagination, leaving a vivid impression upon the mind. When the period of authentic history is reached we are treated to greater detail, but not to such an extent as to show any undue want of balance in the narrative. The illustrations are neither so good nor so delicate as were those in some of the former volumes of the series, but the map is a distinct advance on those formerly produced, and is quite in keeping with the general excellent get-up of the book. There is a full and accurate index. Although it cannot be said that this is the best volume of the series, it is above the average and a very welcome addition.

Le Canal de Panama : Étude Rétrospective, Historique et Technique. Solution Rationnelle pour l'Achèvement Graduel de l'Œuvre sans Augmenter la Dette. Par Félix Paponot, Ingénieur, Membre de la Société des Ingénieurs Civils de France. Paris : Baudry et Cie., 1890. Pp. xv+69.

M. Paponot urges the shareholders of the Panama Canal Company to stick to their script, and propounds a scheme by which the gigantic undertaking may, he conceives, be some day completed. In the first place the railway from Colon to Panama should be finished and furnished with double lines of rails, the works at the two ports named should be completed, and extensive quays be built at each. Once facilities exist for unloading goods on the one side and reloading them on the other, and for transporting them across, *rapidly*, such as would be secured by the works suggested, the stream of commerce would begin to flow across the isthmus by rail, the value of the canal (when finished) would become all the more obvious, and the desire for it all the keener, the shares would go up, and it would be possible to resort to loans again, which would then, under a more promising future, be readily subscribed.

NEW MAPS.

AFRICA.

NORTHERN ZAMBESIA, etc. Compiled for George Cawston, Esq. Scale, 1 : 1,023,970, 16, 16 miles to 1 inch. 1 sheet. *London: Edward Stanford.*

NYASSALAND, A Map of ——. Compiled for George Cawston, Esq. Scale, 1 : 1,023,970, 16, 16 miles to 1 inch. 2 sheets. *London: Edward Stanford.*

These three sheets, which embrace the large area recently occupied by the British South Africa Company, can be joined together, and are constructed on the same scale as Stanford's Map of the Transvaal. All the maps are clearly drawn and brought up to date. But we looked in vain for the new Livingstonia Mission Stations, such as Livlezi Valley and Gowa south of Lake Nyassa, Nindi on Lake Nyassa, Mwera, Chinyera, Ninya, Mombera, and Ekwendeni west of the same lake.

OST-AFRICA, Vorläufige Uebersicht von Dr. Karl Peters Reise in ——, 1889-90. Massstab, 1 : 4,000,000. *Verhandlungen der Gesellschaft für Erdkunde, Berlin*, 1890.

SÜD-AFRIKA, Klimatische Uebersicht über ——. Von W. Krebs. Massstab, 1 : 12,360,000. *Deutsche Rundschau für Geographie und Statistik*, XII., *Heft* 11. *Wien: A. Hartleben's Verlag.*

TOGO-GEBIET, Skizze der vom Pr. Lieut. Kling zurückgelegten Wege zwischen den Orten Pereü, Tzirai und Dipongo (Umgegend von Station Bismarckburg). Massstab, 1 : 60,000.

Mitt. von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten. Jahrgang 1890, *Tafel* 3. *Berlin: A. Ascher and Co.*

TOGO-GEBIET, Forschungsreisen von Hauptmann Kling in dem Gebiete nordwestlich von der Station Bismarckburg, 1889-90. Massstab, 1 : 525,000.

Verhandlungen der Gesellschaft für Erdkunde zu Berlin, 1890, *Band* XVII. *No.* 7. *Berlin: Dietrich Reimer.*

AMERICA.

UNITED STATES, Geological Survey of the ——. J. Powell, Director. 1 : 62,500.

ALABAMA : Talladega, Bessemer, Springville.

ARKANSAS : Magazine Mountain, Mt. Ida, Wellington, Benton, Hot Springs.

ARKANSAS—INDIAN TERRITORY : Fort Smith, Potean Mountain.

CALIFORNIA : Jackson.

COLORADO : Anthracite, Crested Butte.

CONNECTICUT : Stonington.

CONNECTICUT—RHODE ISLAND : Moosup-Putnam.

GEORGIA : Atlanta, Suwanee, Chartersville.

IOWA : Marion, Tipton, Amana.

KANSAS : Independence.

KANSAS—MISSOURI : Kansas City.

KENTUCKY — TENNESSEE : Williamsburgh.

MAINE—NEW HAMPSHIRE : Dover.

MARYLAND : Baltimore.

MASSACHUSETTS : Barre, Dedham, Framingham, Gay Head, Granville, Greenfield, Haverhill, Marlborough, Newburyport, Pelchertown, Providence.

MASSACHUSETTS—CONNECTICUT: Brookfield, Palmer.

MASSACHUSETTS — NEW HAMPSHIRE : Fitchburg, Warwick, Winchendon.

MASSACHUSETTS—NEW YORK : Berlin, Pittsfield.

MASSACHUSETTS — RHODE ISLAND : Blackstone-Franklin.

MASSACHUSETTS—VERMONT : Hawley.

MISSOURI : Fulton, Glasgow, Hermann, Marshall, Mexico, Moberry.

MISSOURI — ILLINOIS : Louisiana, St. Louis West, St. Louis East.

MONTANA : Big Snowy Mountain, Dillon, Fort Benton, Helena.

Nevada : Long Valley.
New Jersey : Glosboro, Hammerton, Maurice Core, Mulicas.
New Mexico : Chaco, Jennes, Largo, Santa Clara.
North Carolina : Mount Mitchell.
North Carolina—South Carolina : Pisgah, Saluda.
North Carolina—Tennessee : Asheville.
Oregon : Klamath.
Pennsylvania : Germantown.
Rhode Island : Burrilville, Kent, Newport.
Texas : Stephenville.
Virginia : Groochland, Roanoke, Warrenton.
Virginia—Maryland : Mount Vernon.
Virginia—West Virginia : Beverley, Christiansburg, Dublin, Staunton.
Wisconsin : Madison.

CHACO SEPTENTRIONAL, Itinéraire de la Mission de Brettes dans le ——, 1886-88. *Bulletin de Société Languedocienne de Géographie, Montpellier.*

OCEANIA.

NAURU (Pleasant Island), Karte der Insel (Süd See). Massstab, 1 : 420,000. *Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Jahrgang* 1890, *Tafel* 8. *Berlin : A. Ascher and Co.*

NEU GUINEA, Originalkarte der Zöllerschen Expedition in das Finisterre Gebirge. Massstab, 1 : 350,000. Nebenkarte : Kaiser Wilhelm Land, Nord-Ost Küste. Massstab, 1 : 3,500,000.
Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 17. *Gotha : Justus Perthes.*

SÜD AUSTRALIEN, Karte der Gegend zwischen Lake Eyre und den Musgrave Ranges in ——. Hauptsächlich nach der Originalkarte und dem Berichte des Henry Y. L. Brown, F.G.S., Government Geologist. Massstab, 1 : 2,500,000.
Petermann's Geographische Mitteilungen, Jahrgang, 1890, *Tafel* 18. *Gotha : Justus Perthes.*

WORLD.

GEOLOGISCHE KARTE DER ERDE. Aequatorial - Massstab, 1 : 85,000,000. Jahrgang XIII., Heft 1. *Deutsche Rundschau für Geographie und Statistik. Wien : A. Hartleben's Verlag.*

CHARTS.

ATLANTIC OCEAN, Mündungsgebiet der Flüsse Aqua Jafe, Rio del Rey, Meta, Andonkat, und Meme. Aufgenommen vom Kommando S. M. S. Habicht, 1889-90. Massstab, 1 : 166,800.
Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Jahrgang 1890, *Tafel* 7. *Berlin : A. Ascher and Co.*

GROSSEN OCEAN, Unfreiwillige Wanderungen im ——. Entworfen und gezeichnet von Otto Sittig. Massstab, 1 : 40,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 12. *Gotha : Justus Perthes.*

NORDATLANTISCHEN OCEAN, Karte des Salzgehaltes an der Oberfläche des ——. Auf Grundlage der Beobachtungen von Lenz, Buchanan, von Schleinitz, Hamberg, Thoulet, sowie eigener Untersuchungen während der Plankton-Expedition. Gezeichnet von Prof. Dr. Otto Krümmel. Massstab, 1 : 27,775,000.
Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 13. *Gotha : Justus Perthes.*

NORTH ATLANTIC OCEAN, Pilot Chart of the ——. November.
Published Monthly at the Hydrographic Office, Navy Department, Washington, D.C.

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Behring's Str.
New Siberian Islands
Wrangel I.
Gulf of Anadyr
BEHRING SEA
Aleutian I.
Petropavlovsk
Kamtchatka Penin.
Okhotsk
SEA OF OKHOTSK
Yakutsk
Aldan
Saghalien Island
Nikolaevsk
Kurile I.
Blagovreschensk
Khabarovka
YEZO
MANCHURIA
Sansing
Tsitsihar
Hirin
Vladivostok
Hakodadi
SEA OF JAPAN
Sinkai
HONDO
Tokio
Yokohama
Kioto
Osaka
Mukden
Ninguta
KOREA
Seul
Great Wall
PEKING
Tientsin
Chefu
Yellow Sea
Port Hamilton
SHIKOKU
KIUSHIU
Nagasaki
Lan-chan
Yang-tse-kiang
Grand Canal
Nanking
Shanghai
Ning-po
CHINA
Hang-chan
Wen-chan
Nan-chang
Fu-chan
Kelung
Pescadores Islands
Formosa I.
Amoy
Tai-wan
Yunnan
Canton
Hongkong
Macao
Port
PACIFIC OCEAN
30
40
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SKETCH MAP OF
ASIA & EUROPE
SHOWING APPROXIMATELY
THE EXTENT AND VALUE OF
THEIR GEOGRAPHICAL SURVEYS
February, 1891
EXPLANATION OF COLOURING
Area of Detailed Topographical Surveys (Scale 1 80000 and larger)
General Topographical Surveys (Scale 1 63 360 and smaller)
Topographical & Geographical Reconnaissance Surveys, Travellers' Route Maps
General Geographical Sketch Maps (largely approximate)
Unexplored Country
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
EUROPE
RUSSIAN EMPIRE
SIBERIA
MANCHURIA
MONGOLIA
CHINESE EMPIRE
TURKESTAN
EASTERN TURKESTAN
TIBET
CHINA
INDIA
PERSIA
AFGHANISTAN
BURMA
SIAM
ARABIA
TURKEY IN ASIA
JAPAN
PHILIPPINE ISLANDS
BORNEO
SUMATRA
JAVA
MALAY ARCHIPELAGO
AUSTRALIA
BRITISH ISLES
FRANCE
SPAIN
ITALY
Scottish Geographical Magazine 1891
John Bartholomew & Co.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

SOUTHERN AFRICA: PAST AND PRESENT.

(*Read at Meetings of the Society, Edinburgh and Glasgow, Feb.* 1891.)

By the Rev. James Stewart, M.D.

The paper which I have now the honour to lay before this Society has for its title "Southern Africa: Past and Present." But, from the method I intend to follow, perhaps it would be more honest to state at the outset that a better title would be "Our Misused or Squandered Inheritance in the South."

The interest attaching to South Africa is not now strictly of a geographical, but of a politico-geographical kind. I hope this treatment of the subject may be regarded as within the limits allowed by this Society, on the ground that geography proper, except in a very limited sense, is not an end in itself, but a means to an end; or, in other words, locality without association is naught. It is the strange sad music of humanity, or the doings of those who have struggled and striven for what rightly or wrongly they conceived to be their duty, and have now disappeared, that affect us most deeply. They filled their day and went their way, with the rest of that procession, which is ever disappearing into a land of whose geography we know nothing.

A second reason for venturing on the course I propose to take to-night is the rapid alterations which have taken place comparatively recently on the map of South Africa; and the fact that the causes which have led to these changes are not so well understood as the existence of these changes themselves. Except on the part of a few who are able to give constant attention to the subject, there is a want of knowledge—I do not say of the general geography of South Africa, but about the positions, relations, and origins of that group or congeries of States of one kind or another which now fill up South Africa from Table Bay to the Zambesi.

The old impression of South Africa as being the Colony of the Cape of Good Hope, possessing a well-defined boundary, but with a vague and undefined native territory stretching indefinitely northwards, has now passed away; and instead, we have now the following States formed, or in process of formation:—the Cape Colony; the Orange Free State; British Bechuanaland; the South African Republic or Transvaal; Natal; Zambesia, or the British Protectorate; and South-West Africa, a German Protectorate or Sphere of Influence: seven in all, without reckoning Basutoland, Zululand, and Swaziland,—all territories under special, if temporary, administration, not yet integral parts of any State except their own, and yet not independent natives territories, like Pondoland. This makes eleven in all; and, if we add Portuguese South-East Africa, about the boundaries of which the tension is considerable just at present, we have twelve.

How did all these come into existence, and assume form or colour on the map, or power, place, and influence even in European politics? When a considerable proportion of us were being taught geography at school, the region covered by these newly-formed States or separate governments was marked on the map by one word—the word *Unexplored*. That single word was all that was thought necessary to describe a territory dire and vast and desolate, fit only for the habitation of wild beasts.

But as time went on, on the fringe of the colonial territory there were men pushing gradually outwards, not exactly as explorers, but seeking lands and a home for themselves, and something they called liberty or freedom—words which, as Professor Seeley says, require a great deal of defining. Not very much came out of these local efforts, if we except one or two expeditions in the interests of natural history, and valuable for such results. And nothing very important occurred as concerns our knowledge of the great Interior till one man commenced his travels. He was the first to reverse the commonly accepted idea. He led the way, and was the first to reveal the true nature of the great unknown land of the far interior of South-Central Africa. He was Dr. David Livingstone, whose name must never be forgotten, however distinguished may be the roll-call of names of those who have followed since. Nor, considering the simplicity and peacefulness of his methods, their wise and conciliatory nature, based on knowledge of native ways and native character, the purity and sincerity of his aims as well as the beneficence of the results, and the moral influence he has exerted on his countrymen, do I think there is any chance or any danger of his name or work being ever either forgotten or surpassed.

In the interests of the people of this country themselves, it would seem that South Africa needs more attention and more comprehension. The time seems now to have come when the people of Great Britain should bethink themselves seriously about the value of their South African inheritance. They should insist on a definite, comprehensible, and continuous method of dealing with it, on principles out of which party government shall not be allowed to make political capital, nor to use or abuse that inheritance by sacrificing it to party purposes or personal prejudices, and, least of all, to sentimental politics, by acts which American,

and even some British, newspapers may applaud, but which the rest of the world and the common sense of mankind will condemn.

Fables have wide applications. You know the story of the ugly duckling, which grew up among a brood of other ducklings, and had a sad life. In its helpless days it was pecked at, and despised, and driven into a corner. It was ugly and ungainly, and had not the ways of the rest. But as time went on, and "slow developed strength" waited on "completion in a painful school," the ugly duckling appeared as the graceful and powerful swan, while the ducklings remained only ducks.

South Africa seems best described, in the past and present, as the ugly duckling of the British Empire. It was long, early, and only known as a good place for big game; later on, it was long known at the Colonial Office as the troublesome province; later on, and all through, it has been known as the grave of the reputation of many a distinguished governor, soldier, and administrator who had served his country nobly and successfully elsewhere in one, or more than one, of the many territories of Greater Britain.

But the days when South Africa was only a good place for big game are gone, and a change has come. The actual, and still greater possible wealth of some of these desert places is beginning to be discovered. For instance, in the midst of a desert of some hundreds of miles of Karroo, there is a spot little more than two miles in diameter, one square mile of which, at one time, was probably hardly worth a few square yards of some of the streets of London. There are now four deep holes in it. They are known as the Kimberley, De Beers, Du Toits Pan, and Bultfontein mines. It seems but yesterday since the furor went through the country about the discovery of diamonds. But out of these four large holes, open at the top, but developed into mines below—diamonds to the value of nearly fifty millions sterling have been brought to the surface and distributed over the world. That has occurred since 1870. Ten years later came the gold of Johannesburg. These are some of the changes which have taken place as to the actual realised value of some portions of that territory, and they may be regarded as predicting greater changes yet to come when the mineral wealth of the country becomes more fully developed. This is looking at South Africa landward.

But let us view our South African inheritance from another point, not landward but seaward. Familiar though its form and position be, let us look again at the great cone of land projected southward between the Southern Atlantic and the Indian Ocean. What is it, rightly viewed and rightly understood, but an advanced post of observation, protection, defence, and, if need be, of attack, should such evil days ever come? It looks straight outwards to the southern ice, but far enough removed from it to have one of the most genial and delightful climates in the world. It looks straight eastwards to another portion of Greater Britain, the Australian colonies. The same degree of latitude which runs through Cape Town runs through Western Australia, South Australia, and New South Wales. It looks westwards, on about the same degree of latitude as Buenos Ayres. And it stands at the entrance northwards by the Indian Ocean to a dependency of Great Britain which is the envy of

the nations of the world, and the government of which, by a handful of our countrymen, is, even with all its faults, the greatest marvel of administration the world has ever seen. Its name is India.

Is there not sufficient reason why this poor African territory should be guarded and cared for, consolidated by wise measures into a compact State, and protected against the entrance of all interlopers from without, who can show no good cause for their presence there? Some may think these are only sentimental reasons. Many questions affecting the relations between the different parts of Greater Britain are disposed of, and often far from wisely, by this summary method. Sentiment, however, goes very deep into human nature and human relations. Evaporate, so as to completely remove by some desiccative process out of human nature all that is called sentiment, or, if you please, the sentiments—moral, æsthetic, and otherwise—and see what you have left as the remainder.

But if there be an objection to sentiment in this matter, let us betake ourselves to statistics, which lie at the opposite poles from sentiment. One reference will suffice. What is the value of the commerce which passes annually along that great water-highway, and goes either to or round that advanced post of observation, protection, and defence which we familiarly call the Cape? The annual value of that commerce at the present time, a time of peace, with the Suez Canal open, is £91,000,000 sterling. Of this, eleven millions goes direct to the Cape, and the remainder to Australia, India, and the Far East. This is in a time of peace, with the Suez Canal open; but if trouble were to arise, which might endanger that canal or the approaches to it, to the above amount there would require to be added all that passes to the East by that route. This would then reach the enormous sum of £150,000,000 annually, without reckoning the value of property in the ships employed. Those who wish to verify these figures, in the most easily accessible way, will find them in Lord Brassey's *Naval Annual* for 1890, as quoted from the Report of the Royal Commission on Coaling Stations and Defences.

Taking now these three facts: the wealth of the country as lately developed, the importance of its position to a manufacturing, commercial, and maritime Power like Great Britain, and, further, that at one time, not so very long ago, the one colony there was the British colony of the Cape of Good Hope,—how are we to explain the extraordinary variety of colours which the map now before us presents as the state of things to-day? There is the red of the British Possessions, the green of the German, the yellow of one republic, and the blue of another; and a still further colour away to the north-east, representing Portuguese claims to a territory in which almost nothing has been accomplished during two centuries. How has this come about?

In explanation I wish now to glance back at the past to enable us to understand the present. And for the history of that period I wish to acknowledge my indebtedness to a book which deserves to be better known—Theal's *History of South Africa*, largely written, printed, and first published at Lovedale, though, I think, republished since. To that fair and comprehensive history, for information on the early period, as well as to Mackenzie's *Austral Africa* on later matters that have not come

under my own observation, I think it right to make this acknowledgment.

How did the Cape first come to be settled? Fully one hundred and sixty-five years passed after the discovery of a passage round the Cape of Storms before any permanent settlement was attempted: that is, if we regard Bartholomew Diaz in 1486 as before Vasco da Gama in 1497. During that long period Table Bay was only used as a harbour in which to refresh crews wearied by long voyages and reduced by scurvy and other sicknesses induced by the hard life and hard diet which were the sailors' lot in those early days. The ships of Portugal, Spain, Holland, and Britain used the Cape in this way during that time, while proceeding to and from what was then known as the East Indies.

In 1648 a vessel of the Dutch East India Company was wrecked in Table Bay, and the crew had to remain five months before they were taken off. It struck one of the officers that a regular settlement there would be of importance to the Dutch East India Company, and a memorial was addressed to the Chamber of Seventeen, as it was called. Three ships, with about a hundred men, were despatched from Holland in 1652; and Van Riebeck, who was commander and became the first governor, took formal possession of the country in the name of the Netherlands East India Company. Thus commenced what is called the European colonisation of South Africa.

But what was thus commenced was hardly a colony. It was a possession or property of the Company, and used solely for its advantage. It had the monopoly of everything, and administered law and justice in its own way. This continued for about 150 years.

In 1795 Holland joined the French Republic in the war against Great Britain. The consequences of that alliance to Holland were, first, the loss of the Cape Colony itself, which was captured by the British; and second, the loss of a fleet sent to recapture the Colony. Matters continued thus for about six years till the hollow peace of 1802 was made by Napoleon, one condition of which was that the Cape should be restored to Holland. It was so restored. But that hollow peace did not last long; and on the renewal of the war with France a British fleet again appeared in Table Bay: the battle of the Blauwberg was fought and lost by the Dutch; honourable terms were offered to the defeated; and in 1806 the British were again in possession of Cape Colony, in whose possession it has remained ever since.

An extraordinary change followed immediately on the first and second occupation of the British. The financial and judicial administration of the country underwent a complete revolution. Expenditure was reduced, taxation readjusted, commerce was declared free, criminal law especially was made more humane, trial by torture being abolished, and "the racks, wheels, and other instruments so used were destroyed and burnt. Since that time no criminal has been broken on the wheel in South Africa," though previously this horrible mode of punishment was in force. In a word, what happened was very much like what is being done in Egypt to-day by a handful of our countrymen who are trying by various changes to substitute a government which shall have for its object the

good of the governed, in place of a corrupt system intended chiefly to benefit those who govern.

Under the wholesome influence of an administration of a totally different kind the Cape Colony soon began to move forward. New life and energy appeared in various directions, and the crowning act of moral progress affecting the country's welfare was the emancipation of the slaves in 1838. This and some other acts of the Home Government affected the country's progress in two ways. It opened a straight road for true and permanent progress in the right direction; but it also produced discontent, because it affected interests which had the roots of their life and growth in the old state of things. It is necessary to keep this in mind in order to understand the changes that have taken place in South Africa since that time. Then there was only one British colony, that of the Cape of Good Hope. Now there is all that assemblage or congeries of States you observe on the map. How did all these States arise? And a still more curious question is, How is it that, seeing nearly all of them have at one time or another been under the dominion of Great Britain, or in connection with it, they are now independent States to-day? The only explanation which can be given, in reference to South Africa at least, is, that what we do to-day we delight to undo to-morrow; that we expend money, effort, and life to put right a territory in which anarchy or some form of maladministration exists, and, having done so, we as suddenly retreat, and leave things to recur to their former state, or to a condition much more difficult to deal with later on.

North of the Cape Colony, and adjacent to it, we see the Orange Free State, the South African Republic, and, further off, the Colony of Natal, as well as various other territories. What causes led to the formation of these States? Let us limit our inquiry meantime to the three last mentioned.

The immediate or proximate cause was the movement known as that of the emigrant Boers, or farmers, northwards into the regions which now constitute these States. But the remote or real causes were as follows:— (1.) The emancipation of the slaves in 1838. The estimated value of the slaves held in the Colony was £3,000,000. The proportion which fell to the Cape of the £20,000,000 paid by the British people was £1,230,000; as full compensation was not given in the Cape, or in any other of the British colonies or possessions. The compensation fund was not well managed. The amounts were payable in London, and many of the simple and ignorant farmers and slave-owners were victimised by agents into whose hands they fell. Discontent arose from this cause, as well as from another at an earlier date. (2.) The passing of what is known as the Fiftieth Ordinance in 1828, which placed a large portion of the aboriginal population, namely the Hottentots of Cape Colony, for the first time in the position of freemen. Their position previously, from a variety of causes, was scarcely better than it had been in the days of the Dutch East India Company. This change was largely due to the missionary labours and action of the well-known Rev. Dr. Philip, seconded in the British Parliament by the efforts of Buxton, Brougham, Wilberforce, and others. (3.) The disturbed condition of the frontier of the Cape

Colony, and the dissatisfaction connected with the cession or restoration to the Kafir tribes of a province or district which had been taken from them during the previous wars. This was the outcome in part of what was known as the Glenelg policy.

All these, however, are largely reducible to one principle, namely, the inevitable collision between the British policy as regards the natives and the old Dutch policy. It is perhaps not correct to call it the old policy, for one of the chief points of difference at present between the Dutch and English in South Africa arises from this same cause, and only the pressure and force of the latter form of opinion prevents the former revealing and attaining its full power. I should be sorry to say anything that would give offence to any one; and I am equally sorry to be unable to speak as regards the past otherwise than as history records, and what it does record is this: that widespread discontent existed; that many, owing to the loss and waste inevitable to a transition state, and to an inability to accommodate themselves to the new condition of things, became impoverished. British policy was held accountable for all this, though, as may been seen, the causes of the changes were *moral* rather than political. They affected the rights of other human beings, who have their rights, not less than men with a different colour of skin. These old colonists could not see that there is a tide of moral progress in the affairs of men which it is vain to try to stem; perhaps even their descendants do not quite clearly see this. But these men of a former day resolved to leave all this hated condition of things behind them; and out of this state of mind and feeling arose the movement I have mentioned of the emigrant Boers or farmers across the Orange River. This movement began on the part of a few as early as 1834.

On the northern and eastern frontier of the Cape Colony they had long been accustomed to roam through wide lands with their flocks and herds, and to do pretty much as they felt inclined without very great regard to the rights of the natives. As British administration became more perfect and more extended they found their liberty very much restricted, and their power of resistance to law commensurately diminished. At first a few only went across the Orange River into what is now the Orange Free State; then a few more, till thousands found a home there. Thence they passed onwards to what is now the Transvaal Republic; then over the Quathlamba mountains into the richer country now known as the Colony of Natal. It was there that the first collision with the British power took place. The struggles of the Boers with the Zulus were protracted and sanguinary, with great loss on both sides.

It must be remembered that these Burghers were still British subjects. To put an end to these sanguinary contests the Governor of the Cape issued a proclamation to the effect that it was desirable "to put an end to the unwarrantable occupation of part of the territories belonging to natives by certain emigrants from the Cape Colony, being British subjects," etc. He also sent up a small British force and occupied the Bay of Natal, but otherwise such form of government as the Boers had established was scarcely interfered with. That force remained less than a year, when it was withdrawn. Shortly after that, another collision

with the natives occurred, and again a British force was sent to Natal. It was attacked by the Boers, partially defeated, or at least besieged, for a time, then reinforced, and immediately after reconquered the country.

In August 1843 Natal became a British Colony, and has remained so ever since. Many of the Dutch colonists settled down quietly on the lands they possessed under the British Government. Many, however, were still discontented, and again the stream of emigration rolled backwards the way it came. Those dissatisfied with the British Government moved over the mountains again to the Orange Free State and the Transvaal. In the former a British Resident was appointed at Bloemfontein. He had but a small and inadequate force, and was expelled. He retreated to the British side of the Orange River, and quietly waited for reinforcements. These came in due time. The battle of Boomplaats was fought, and ended in the defeat of the Dutch Burghers; and the Orange Free State was constituted into a British Sovereignty under a Lieutenant-Governor and Legislative Council. In England, meanwhile, ideas of economy about Imperial expenditure and scruples about annexation and such like led to a change of policy, and Sir George Clerk was sent out as Special Commissioner with directions to abandon the Sovereignty. This procedure produced consternation among the colonists of the Cape, among the loyal portion of the inhabitants of the Sovereignty, and specially among the natives, who, in the belief that it was now a British province, had taken up their abode in the newly-constituted State. But in February 1854 the Orange Free State Sovereignty was handed over to an Assembly consisting of a president and twenty-four delegates of the people. The Convention which was signed gave the inhabitants of the new republic political independence, and freed them from their allegiance as British subjects. It prohibited slavery, referred to treaties with native chiefs, and safeguarded the natives in so far as could be done by the terms of a Convention. Thus, the territory now forming the Orange Free State Republic, lately a British Sovereignty, passed away in this fashion, after a brief life of six years as a portion of the Empire. Professor Seeley says somewhere, in speaking of the expansion of England, that we have "conquered and peopled large territories or areas of the world in a fit of absence of mind." If that be so, it is difficult to describe the state of mind in which we give away those territories again.

A much briefer survey will serve for the other State—the South African Republic, otherwise called the Transvaal. When the battle of Boomplaats was nearly over, Pretorius, the leader of the discontented Burghers, saw that all was lost. He had everything in readiness. The wagons for himself and his followers were equipped for a new departure, and were safe at a position many miles off. He rode off the field of battle, and was soon safe across the Vaal River, which is still the southern boundary of the South African Republic.

Here again the same sequence of historical events occurred. The old story of setting up a republic was repeated. The native question was dealt with by the old merciless system of the *commando*, in which the innocent and the helpless were often the victims instead of the guilty. There were frequent troubles with the native tribes on the north-east and

also to the west; and it was in one of the latter, with Sechele, that Dr. Livingstone's house was plundered and burnt. In England it was thought desirable to disclaim responsibility for such doings; and in 1852 the independence of the South African Republic was formally acknowledged. In the Convention there were the usual provisions against slavery and against selling ammunition to the native tribes, and so on, but neither side seems very carefully to have observed the treaty.

Then followed the long war with Sekukuni; then serious financial mistakes in the administration, and a period of decay in the republic. Gold had been discovered. But with plenty of gold in the soil, there was none in the Transvaal treasury. Matters were getting worse year by year, when an unexpected event occurred. This was the annexation of the country by Great Britain in 1877. It was quietly done, not a shot was fired, but it was a little too early.

Under the new administration the country improved rapidly. Land rose in value, and every product of the land also in proportion. But there was the discontented minority, the remnants of the same party which had established the Orange Free State, and also nearly obtained possession of Natal. In less than three years this discontented party rose against British rule. The country was insufficiently garrisoned, the merest handful of men being placed in it. Then followed the miserable affairs of Bronker's Spruit, where a company of English soldiers were surprised and shot down; then the siege of Pretoria, and the disasters of Laing's Neck and Majuba Hill. These events were hardly public, when suddenly, and it might almost be said to the surprise of the whole world, peace was made, and the independence of the South African Republic was acknowledged *for the second time.*

By certain newspapers this was applauded as "the finest thing in history." But like many acts which receive applause while the common sense of the question is left outside, little but mischief has followed since. An exaggerated idea of its military prowess took possession of the newly resuscitated republic, and the settlement of South African affairs was rendered more complicated in consequence. Since that recognition of independence there have been aggressions or troubles connected with native territories, west, east, and north-east into Bechuanaland, Zululand, and Swaziland. To check the first of these Sir Charles Warren's expedition was necessary. Out of a freebooting or filibustering expedition from the Transvaal there was growing up the two so-called republics of Stellaland and Goshen or Boor Grond, which were extinguished by that expedition. Children sometimes die of fright. On this occasion two infant republics never recovered the shock, though not a blow was struck nor a shot fired. A sufficient force was sent, and in consequence there was no fighting. But about Zululand, Swaziland, and Amatongaland it is difficult to say what will be the settlement. At present all is provisional or unsettled. And the "finest thing in history," the retrocession of the Transvaal, has cut a very sorry figure ever since the day it was so baptized.

Conclusions.—By putting before you some of the events of the past as showing their bearing on the present, my wish has been that you

should form your own conclusions. But I may suggest some for your consideration.

As to the method followed, or the guidance given, by the Imperial Government to the extension of the Empire in South Africa, there may be noticed this: an alternate assumption and abdication of the duties and responsibilities of government. A territory is pressed upon us by some force of circumstances, by the prayers of the native people and chiefs; or we interfere on the ground of humanity; or of self-interest, on the principle that a fire in the house next door may spread to your own. We fight one or more battles, and spend more or less of money and life. Or we walk in quietly without fighting, and, as Cromwell did, we say "Take away these baubles—we can govern better than you have been doing;" and we settle down and commence administration of the country with about as much composure as we proceed to dinner. In two years, three years, or six years, or more, a sudden fancy strikes us, or a fit of absence of mind happens to some one at home, and we pack up all our administrative apparatus, hand over the whole territory to an assembly of the people chiefly composed of a discontented minority or majority, as the case may be; we say "Good-morning," and we are off. This has happened more than once, to the astonishment and surprise of the discontented minority, to the dismay and loss of the loyal portion of the inhabitants, both English and Dutch—for there are loyal Dutchmen—and to the probable punishment or destruction of our native allies if they have shown their loyalty over much.

Reasons of state are usually urged as explaining and excusing these sudden changes. But reasons of state cannot require to run on always in a series of contradictory propositions. Nor can that which is right and necessary one year be precisely the reverse in the following year.

The chief causes of this singular procedure are threefold: first, the want of any fixed principle in dealing with South African affairs; second, the want of full, sound, and sifted information at home, both in public opinion and at the Colonial Office; third, and chiefly, to the miserable influence of party politics. And until questions relating to the Empire abroad are removed out of the reach of party strife, we may expect in the future what has taken place in the past.

In all this confused welter of South African affairs for the last seventy years, what fact or factor do we notice as constantly at work and always coming to the surface, even if its voice may not be very distinctly heard? The answer is one you hardly expect. It is the Native question, of which the Land question is only a part, though an important one. It is here that the two currents of Imperial policy and Colonial policy meet and come into collision, and produce a confused and troubled sea. The Imperial policy, guided in its course by the principle that the good of all the governed is the true function of Government, even in these distant Native territories, has, on the whole, always pointed in that direction as truly as the "conscious needle to the north." There have been aberrations and deviations from local magnetisms in the shape of party influence, but, generally, what is now stated I think is true. You may trace the influence of this—the Native question and the action of the Imperial

policy in connection therewith—as far back as the time of the passing of the Fiftieth Ordinance in 1828: onwards through the emancipation of the slaves in 1838; through the Glenelg policy, right or wrong, wise or unwise as a measure after what had previously occurred, and has happened since; still onwards through the events which led to the interference of the British in the early days of Natal; later on, in the assumption even for a brief period of the responsibilities of Government in the Orange Free State, and also in the South African Republic or Transvaal; and last of all, in the despatch of Sir Charles Warren's expedition only a few years ago. Now if you accept this as a true theory, and one which is supported by these different historical events, and which is in fact their true explanation, morally as well as politically, we find here the key to these constantly recurring difficulties between the two policies, the Imperial and Colonial. The latter is too much weighed or warped with individual and conflicting interests to rise to the high altitude of the former. Hence we have the conflict; and we hear such phrases used at the Cape, even at the present day, and by those from whom better things might be expected, as "the elimination of the Imperial factor." Considering what that country is, and would be if left to itself, and what it owes to Great Britain in the past, this strange expression has about as much sense in it, as there would be in speaking about the elimination of the atmosphere.

If the view mentioned above be accepted, it also points to a guidance of affairs in the progress and welfare of men, even of the despised races, by an influence higher than either the Imperial or Colonial factors; or in other words, it points to the existence and active interference of a government above, in the action of a divinity or Providence that shapes the ends of states as well as of individual lives, rough-hew them as we may.

I repeat my belief that the Native question has been the silently influencing element in the past, and I submit for your consideration the facts I have now mentioned. And if the view given be correct, it will follow that the same question is the important one of the future, as concerns the successful and peaceful administration and development of that vast territory now marked red, by recent extensions. Our mines, our agriculture, our transport, the peace of the country, and its consequent steady progress, largely depend on our dealing justly and loving mercy, and so securing the goodwill and assistance of the natives. They are not difficult to manage if the right way is taken. They are not bad workers if our expectations are reasonable, and their previous history, as men to whom regular, steady, systematic work is an entirely new thing, is fairly considered. But they require training and patience, and they can be always troublesome, and sometimes formidable, enemies if the wrong way is taken. The purely military method, which the Germans so much admire and trust to, is not the best nor the right way. The colonial policy which is based largely on the colonial need or greed of land and more land, and which, by the constant absorption of land, sooner or later leads to discontent and war, is surely not the only or best possible way that can be discovered. The Imperial policy, which does

not as a direct result of any quarrel deprive them of all their lands by clearing out entire districts, which regards the authority of the chief within certain limits, and utilises it for administrative purposes as long and as far as it is really useful, and which proceeds slowly and allows the native people time to comprehend the strange conditions of the new civilisation rolling in upon them like an advancing and resistless tide, is surely the better and fairer way. It protects life and property, it gradually supplants a rule of despotism and often of blood by a mild form of government, and after a time it finds the people well disposed to its rule, if no untoward accidents occur. Its principle is the soundest, because morally more just; and it is therefore the safest, and over a period of time is likely to be the most satisfactory. The chief difficulty arises from the increase of population, both black and white; for though men multiply, acres do not. But the country, as a whole, is not over-peopled. For its area, it is very sparsely peopled; and, with the development of the country into something better than a merely pastoral territory, some of these should disappear. At any rate a time must come when both Black and White shall have to understand that there is no more land to be allotted or given away for services either in peace or war, and that all land wanted henceforth by individuals or by tribes must be bought and paid for. The fathers have got all that is available; the sons must betake themselves to other occupations than those connected with the land.

But yet, even with different views and disagreeing policies at work, it cannot be doubted that, during the British occupation of South Africa, the condition of the native people, who though black are still Her Majesty's subjects, has greatly improved; and that it is very different from what it would have been under a different *régime*. Their whole position will compare very favourably socially, in point of education, and in the accumulation of property, with that of the same race in the Republics to the north. Yet there are men, even Englishmen, who think the method adopted in those republics is the ideal method for the management of natives. Many years ago I met Mr. Froude in South Africa. He was expressing his great admiration at the way in which the natives were ruled in one of these republics, as compared with the system in the Cape Colony. I listened attentively, and deferentially proposed the following questions :—

"Can a native hold land in these republics by individual title?"

"No," was his reply.

"Then," I said, "that must be hard on the native, for to him, in his present condition, land and life are almost synonymous terms. And he might say: 'You take away my life, if you take away that whereby I live.'"

I said: "The native is a subject of the State; but he is, nevertheless, not a citizen. If he should have accumulated property, or be otherwise qualified, has he any vote of any kind?"

"None whatsoever."

"Is there anything done for the education of all these people by the State?"

"Nothing by the State; only what is done by missionaries. These people are children yet, and they cannot value or use these things."

I replied: "That may be true; but so also is the fact that thirty or forty years after this, when these people have increased and multiplied, as they always do steadily when there is peace and prosperity in the country, there will be a mass of ignorance and comparative barbarism, dangerous and difficult to deal with. And that is a problem which must be dealt with some day; better now, than when too late."

I can verify what I have said about education by another incident. Some years later I met the present esteemed Superintendent-General of Education in the Orange Free State. I asked him if he would kindly tell me the amount expended annually by the Free State on the education of the natives. He smiled, and said that was easily done. The amount was forty-five pounds annually in the form of a small grant—fifteen pounds to three native schools. You will understand how great is the difference as to the way in which the subject of native education is regarded in the Cape Colony, if I say that at Lovedale we receive from the Education Department over £2000 a year; while similar institutions receive lesser sums for the same object.

In mentioning these things I hope my meaning and motive will not be misunderstood. I know well that there are men in the Legislative Council or Volks-raad, as it is called, of the Free State with ideas far in advance of those of the majority, and who indirectly aid and approve of missionary work; and I take this opportunity of paying a tribute to the memory of its late President, Sir John Brand, whose wisdom and uprightness and calm forbearance were a blessing to South Africa.

The last point before us is this. Proceeding with the light we have gathered, what or which, we may ask, is to be the future dominant power in South Africa? Look again at the map. We have now four colours to choose from—red, orange, blue, and green. Southern Africa, if we had been wiser or more consistent, need not have been so varied in hue. It might have presented one uniform hue without real or substantial injustice to anybody, and with probably substantial benefits to many.

We may leave out the green. The Germans have no business there. And it would seem to indicate the low or even indifferent value they set on the good feeling and friendship of this country, that they have taken up a position next door to one of the oldest of British colonies. It is a position which is at once anomalous and dangerous both to them and to us. Without further acquisitions the territory is practically useless to them. And further acquisitions on their part means further concessions on ours, and further loss of good feeling between the two countries. For what are they waiting in the desert of Damaraland, where so little is to be got at present?

There is the yellow and blue to choose from, of the two Republics. Some would like to see the blue of the Transvaal becoming the important factor. But let us hope that the dominant power will be the British power, and not a Transvaal power, nor a hybrid union of the two, the name of which will mean one thing and the spirit and ideas of which will mean quite another. The question of the future is very much that of the

difference between British ideas and modes of government and the views and methods of government of which the Transvaal may be taken as the representative.

It can hardly be supposed that the little Cape Colony will either be able or be allowed to stretch its feeble arms northwards over any considerable portion of that vast area coloured red on the map. All this seems to point to the necessity for some kind of union or confederation in which, within the boundaries of each state as at present fixed, each state shall mind its own business, and try to live in peace and unity with its neighbours; and that these states, together with the vast areas beyond their boundaries, shall be under the control of the Imperial Government, represented by an officer—whether "High Commissioner" or "Governor-General," or whatever other name may designate his functions and position. Sir Henry Loch and Mr. Rhodes are both in this country at present; and about these great areas stretching northwards beyond the Zambesi and as far as Lake Nyassa some points of agreement and settlement with the Imperial Government are probably being reached. On these I have neither the information nor the presumption to qualify me for expressing any opinion at present. But let us hope that the day is not very far distant when some sort of confederation will be reached. In Australia they have begun to move in that direction, and, though the difficulties are many, success may yet attend the effort. Should a similar movement be carried through in South Africa, the "troublesome province" may yet become the fourth member of that great group of States which Professor Seeley speaks of as forming Greater Britain beyond the seas. These are the Dominion of Canada; the West India Islands; the Australian Colonies, including New Zealand; with South Africa added as the fourth; while India, from its peculiar position, stands by itself as the fifth.

Professor Seeley also says there are two schools of opinion in reference to our colonies, or the portions of the Empire which lie outside our own island. These are the bombastic—too severely so called, I think—and the pessimistic; but he might have added another, that to which he himself apparently belongs, and called it the sober, moderate, and common-sense school.

The first or bombastic is so named because it delights to express itself about "the Empire on which the sun never sets," and likes to hear "the beat of morning drum following the hours," as the dawn awakens the sleepers through all the longitudes round the circle.

The pessimistic school is that which has always regarded those portions of the Empire outside the island of Great Britain as outlying properties to be used solely for the benefit of the mother-country,—as troublesome and expensive properties, constantly in need of repair, and requiring a large host of caretakers in the shape of soldiers and sailors. This school regards these properties as acquired by rapacity and conquest, as burdensome and dangerous, and to be got rid of at any cost, and as soon as possible.

Neither the facts of history nor of the commercial relations of Great Britain favour the views of the pessimists. There has been long-continued

and comprehensible unwillingness on the part of the Imperial Government to extend the boundaries of the Empire. There have been too many retrocessions to allow of that view being accepted. The existence on the map before you of two republics imbedded in the heart of our South African territory is one proof among others of this unwillingness.

There is also the existence of a law which these pessimists forget or have never known. It may be called, for want of a better name, *the law of life and growth.* States no less than individuals obey this law, and cannot help themselves. No one of us here has ever been asked whether we shall grow, or how. We may take absurd ways to counteract that law, but we shall continue to obey it in some form, with results corresponding to our wisdom or our folly. It is the same with states as with individuals, till decay sets in, or death or destruction comes. And it is in virtue of this force that our South African Empire is what it is to-day; though it might perhaps have been better and stronger than it is to-day. Instead, therefore, of whimpering and grumbling, or growling over the vast heritage which God has given us, let us rejoice in it, and in the vitality and force it expresses, and thankfully accept the great duties and responsibilities it imposes.

ON THE COMPARATIVE VALUE OF AFRICAN LANDS.

(*Read at a Meeting of the Royal Society of Edinburgh, 16th March* 1891.)

By A. Silva White, F.R.S.E.

(*With a Map.*)

On the map which accompanies this paper I have endeavoured to define, as far as our present restricted knowledge can appreciate, the relative value of the vast lands of Africa which, year by year, are coming more and more under the influence of European Powers. Conscientious students of geography cannot fail to be astounded at the loose statements regarding Africa which, under the stamp of quasi-authorities, too often obtain currency, and tend to give the guileless public an entirely false or confused notion of the advantages and disadvantages attending the European domination. Even writers who are competent to give instruction regarding one or more of the well-defined regions of Africa allow themselves to be carried away by their enthusiasm, or become lost in their geography, and claim for their descriptions an application that is almost boundless. Yet, our present knowledge of Africa, imperfect and limited as we know it to be, is sufficiently comprehensive for us to recognise well-marked physical and political characteristics, which differentiate certain geographical areas within the vast continent. It is, therefore, quite possible to investigate what may be regarded as distinctive natural regions, and to compare them one with another. Such a method is, moreover, capable of adjustment to any particular point of view and of being focussed to the closest scrutiny. We are, in short, able to distinguish.

and consequently to appraise, the leading characteristics of comparatively small areas.

In estimating the comparative value of African lands, my standpoint has been that of the European diplomatist, who requires to look a little into the future. Our knowledge of the vast Interior is for the most part too imperfect to hazard even an estimate of its potential value, which only time can determine; but, on the *Hinterland* principle, these remote regions have even now a recognised political value. The energies of the European Powers in Africa are consequently directed, partly to the development of restricted regions bordering the coasts, and partly to the acquisition of territories which may at some future time be valuable as *Hinterländer*. The former are capable of appraisement, for in most cases they have been carefully exploited, but of the latter we know so little that a rough valuation is all that can be obtained at the present day.

My map illustrates in a graphic manner what, in my opinion, is the relative value of African lands to any European Power having control over them. Before explaining the scheme upon which it has been constructed, it may be desirable to state the general principles that have guided me in my investigation.

I conclude that the value of Colonial possessions is regulated by the capacity of the suzerain or dominant power to make use of them, and is discounted by its incapacity in this respect. All humanitarian motives may be set aside as not being pertinent to the present inquiry.

Now, we know, from long experience and from the testimony of history, that in the past, and presumably for many years to come, the coastal lands of Africa have been, and must continue to be, the most valuable to a European Power, and that they increase in value in direct ratio to their contiguity to navigable rivers. The possession of a political base on the coast is, I need scarcely add, absolutely essential for the operations of any European Power in the Interior. Isolated *enclaves* of territory decrease in value the further removed they are from the coast or from navigable waterways leading directly to the coast.

Again, it has been abundantly demonstrated that, throughout the greater part of Tropical Africa, there are very few regions where European colonisation is possible. It is only when we enter the sub-Tropical and Temperate Zones, or ascend the high-plateaus above a certain altitude—districts which are necessarily at a distance from the coasts—that we find regions adapted to colonisation by Europeans.

It follows, therefore, that, however valuable a district may be in itself, its value is discounted in proportion to its degree of inaccessibility. At the present day, and for some time to come, the great arterial river-highways conducting into the interior of Africa, starting from a base on the coast, indicate, and will continue to indicate, the routes by which European enterprise must enter on its conquest of remote regions. The possession of these natural highways is therefore of prime political importance. Artificial highways, such as railways, can of course be constructed; but such construction, involving the outlay of capital, itself discounts the intrinsic value of the lands they traverse. At the same time, since easy and

practicable communications are the main factors in the development of remote regions, other than continuous fluvial highways may serve these ends: as, for instance, a valuable land-and-water route like that by the Zambezi and Great Lakes, or along the comparatively healthy axis of elevation in South-East Africa.

The first step in my inquiry was to mark off distinctive regions. These, in the main, correspond with the drainage-areas, and are all capable of being studied under sub-regions. The following were the regions selected for comparison:—Mediterranean Littoral, North-West Africa, Sahara Desert, Lower Egypt, Red Sea Littoral, Upper Nile basin, Upper Guinea, Niger basin, Central Sudan, Lower Guinea, Eastern Horn, Congo basin, Zambezi basin, East Coast, N'gami basin, South-West Coast, South Africa.

Having obtained, in the above territorial divisions, large characteristic areas that are capable of being compared one with another, both from physical and political points of view, I selected what appeared to me to be the main factors determining the value of these lands to a European Power. But, these factors not being of equal relative importance, it was necessary to assign to each a fair proportion of the highest aggregate value. The following table exhibits the main conditions to which I have alluded, and their percentages of value:—

	Percentages of Aggregate value.
A. Climatic Phenomena: Temperature, 10; Range of Temperature and Relative Humidity, 5; Absence of Malaria, 5: . .	20
B. Natural Communications: . . .	10
C. Natural Resources: Animal (including elephants, or ivory) and vegetable, 10; Mineral, 10:	20
D. Exterior Trade and Commerce: Chiefly volume of Trade (exports and imports), .	10
E. Indigenous Political Conditions: Religion or faith, 5; Native culture, 10; Relations with Europe, 5:	20
F. Foreign Political Conditions: Character and extent of European domination or settlement, 10; Capacity for development of European institutions, 10: . . .	20
Highest value =	100

It is, however, obvious that, having in this way obtained the mean average value of extensive natural regions, these estimates would be subject to considerable modification when one attempted to apply them locally. Each group of graduated values, applying to a distinctive natural region, became more and more affected as it approached another such group, not unlike the crumpling of *strata* under pressure of opposing forces. The final result is shown on the map, so far as such an inquiry can be

elucidated by a simple mechanical process; and I feel convinced that, though it may challenge the criticism of gentlemen exclusively interested in particular parts of the continent, the student of African geography will be prepared to indorse its general accuracy.

As a rough and ready means of testing the general accuracy of my map, I selected a scheme of colouring that illustrates three broad generalisations, namely:—(1) areas of highest resistance against the European domination, which are coloured in four gradations of *blue*; (2) areas of highest relative value to the European Powers, which are coloured in five gradations of a *reddish-brown*; and (3) the intermediate or transitional regions, which are coloured in two gradations of *yellow*. It should be added, that these generalisations were drawn *after* the percentages of value were laid down on the map, because they only then became apparent.

Quite apart from the percentages of value that have been given to these regions, respectively, a glance at the map will, I think, reveal the approximate progressive value of African lands at the present day. In order to express this in a graphic manner it was essential to adopt the simple method of "contour-lines." It does not at all follow that every square mile of land within a given periphery is exactly of the value given, but only approximately. Had I attempted to define areas of equal value, I should have had to discard the present graphic method, and to have adopted one, the result of which would have closely resembled a geological chart. The method which I have selected, however, expresses approximately the relative value of the lands themselves, and their progressive value in relation to their geographical position.

It will be observed, for instance, that the highest values lie in contiguity to the coast and to the great river-highways leading into the Interior, whilst the lowest values coincide with areas most remote from the coast, or over which climatic or political conditions are in the highest degree inimical to their development. It will further be observed that the salient portions of the peripheries indicate the directions in which, in the case of the highest values (*brown*), the development of African lands is likely to be profitable; whilst, in the case of areas of low value (*blue*), they have a precisely contrary signification. Where, also, the lines of graduated values lie close together, the presence of some powerful, political or physical, obstacle is clearly intended to be signalised. These abrupt, or steep, gradients are conspicuous in the neighbourhood of desert regions; and they are the more abrupt if, as in the case of South-East Africa, valuable regions lie in contiguity. The outstanding value of South Africa is, of course, due to its relatively healthy climate, its organised political institutions, its strong base on the coast, and its rich natural resources; whilst the low value given to the fertile regions in the Upper Nile basin is chiefly due to hostile political factors, which at any day may be suddenly reversed.

A free reading of my map should, consequently, illustrate the lines of least resistance against the European domination in Africa. Each characteristic natural region has its strategic base on the coast in the possession of one or more of the European Powers, and from which operations in the

Interior can be most profitably directed. Rapid and easy transit to the coast is, in fact, the first essential condition for the profitable development of remote African lands; and it would mutually benefit the Powers if all the great river-highways were internationalised.

In other respects the map should explain itself. Space forbids my entering into a discussion of all the *data* that have determined the final result of my investigation. Indeed, to convince the reader that no line on the map has been drawn at hazard, but only after careful study of local conditions, I should have to give a complete account of physical and political phenomena in Africa—a task I have already performed in my book on *The Development of Africa*, which should meet the requirements of my critics.

A word in conclusion. Since the present investigation is somewhat novel in conception, and may be based on false principles, I shall feel indebted for any criticism that may be offered. If, on the other hand, it should prove the forerunner of similar inquiries, it would be well to introduce a new term in place of "contour-lines," as the method of expressing the relative, progressive value (political and physical) of a given region. My colleague, Mr. W. A. Taylor, has suggested two words, either of which, in default of a better term, might be adopted. These are:—*isochrestic* (from ἴσος equal, and χρηστός useful) and *chrestographic* (from χρηστός useful, and γράφω I write). The latter is more euphonious, if less scientific. Instead of speaking of "contour-lines," which is liable to mislead one, it were better to employ such a term as "chrestographic curves," or its equivalent.

EXPLORATIONS IN BRITISH EAST AFRICA.

THE pioneers of the Imperial British East Africa Company have recently been accomplishing excellent work in the topographical survey of the country, in opening up new roads from the Coast, and in founding stations. We have been favoured by the Company with two reports, accompanied by original maps: the one by Captain Lugard, the other by Mr. Jackson. These reports carry a thin thread of topographical knowledge from the East Coast, by way of the Sabaki Valley, westwards to the Victoria Nyanza.

Captain Lugard's report, dated Mombaza, 16th May 1890, deals with an expedition under his command, which, starting from the Coast on 21st December 1889, eventually penetrated as far as Muchako's, in Ukamba. An interesting feature of his expedition was the attempt to make use of animal-transport in place of caravan-porters. He started with three camels, four mules, and fifteen donkeys of a local breed. The caravan itself comprised eleven Persians, four headmen, ten Askari, three Madrasees, and ninety porters.

The mules and donkeys, not having been provided with proper saddlery and gear, suffered terribly from girth-galls and sore backs. The men were not trained muleteers; they did not know how to load and saddle and tend their animals. But Captain Lugard points out that

capable muleteers can be obtained in any number from Persia. He recommends the gear used for mules, ponies, and donkeys in India, which, from long experience, has been found serviceable, and that a veterinary surgeon should be sent out with a stock of medicine. His opinion is that the indigenous donkey and imported mules might thrive in the country, the latter being preferable. A mule can carry four men's loads, whilst one man can attend to three mules or twelve loads, thus saving considerably in transport. Camels, which carry six men's loads, would do well in many parts, and could be employed on certain stages where fodder for mules is scarce; and elephants would be extremely useful in conveying steamer-pieces, railway-plant, and other indivisible loads. Captain Lugard appears to believe in the domestication of the African elephant. Absence of forage is the greatest drawback to elephant-transport; but in the Sabaki Valley the dense forest tract affords excellent forage for elephants, great numbers visiting the district at a particular season.

The first station which Captain Lugard founded was at Makangeni, on the Sabaki, about 83 miles distant from Mombaza, and at the junction of the routes to that place and Malindi. The animals were then in excellent condition; but, as the work in cutting a way for them through the jungle had been very severe up to Makangeni, it was decided to abandon animal-transport and to rest satisfied with the experiment so far. Porters were therefore enlisted to supply their places.

The country between Mombaza and Makangeni is for the most part hilly. The intermediate country (some 50 miles) is difficult for railway, but offers no impediments to animal-transport. Water is obtainable in the driest season at distances suitable for caravans, except between Fuladoyo and Makangeni. Large areas are cultivated by the natives, whose villages are frequent and large. The soil is for the most part poor, being generally of a red marl, and large areas of forest are still unreclaimed. There is sufficient grass all along the route for fodder, but of an inferior quality. The crops are mostly *mahindi* and *mahele*, one kind of *kundi* (bean), and a little *mahoga* (cassava), *dhal*, *wimbi*, etc. In an ordinary season there should be an ample food-supply along this route, and fuel is abundant.

Having established a garrison at Makangeni, Captain Lugard left for Muchako's by way of the Sabaki Valley. He reports as follows on the adaptability of this route to caravan-traffic :—

"Its great drawbreak at present lies in the fact that the whole stretch of country is entirely uninhabited, and food is therefore unobtainable. This difficulty it was the object of my journey to meet, so that by building forts at intervals for the protection of the road, and establishing villages near them on sites suitable to cultivation, a population should grow up, who would till the land, and produce large quantities of grain for sale. While the route has this temporary disadvantage, it has the far more than counterbalancing advantage of a continuous and good water-supply, and the abundant fish in the river afford food to the men, and render the route very popular. The very fact of the land being uninhabited is in one sense an advantage, since it becomes the property absolutely of the first occupier without purchase or dispute. It therefore offers a special facility for the introduc-

tion of Persian or Indian colonists, or the settlement of villages of Watoro, who have worked out their freedom, or other such special *protégés* of the Government.

"The line is cut in many places at right angles by the 'Masai roads,' or war-paths of the Masai, which they traverse (especially in this, the rainy season) in their raids into the country north of the Sabaki to capture cattle, etc. Their bands are of considerable strength, and, being abroad purely for the purpose of fighting, are generally hostile to all they may meet. One road only is of much importance, but all are used more or less frequently. These remarks are meant to apply to the whole route as far as Nzoi, and not merely to the Sabaki portion of it. From Makangeni continuously for some twenty or thirty miles the country offers very great inducements for cultivation. The soil is very rich (mostly that called in India 'Black Cotton'), and the large openings in the forest, clothed with most excellent grass, would at once furnish either the best of soil for cultivation, or fodder and grazing-grounds for cattle or transport animals. In the body of the road-chart itself, I have given full details of the whole route as regards soil, etc., and in the margin a short description of the special points connected with each Station, and the reasons which led me to select it. Beyond this belt of low-lying rich soil the country is for the most part scrub-forest, and the soil very bad. Undulating quartz-hills alternate with stretches of hard, red, marly sand, growing little but thorns and cactus. Throughout the whole route, however, glades intervene at intervals, and these are of the same rich soil, and covered with the same rich grass. The geological formation consists uniformly of a slaty or shaly rock near to, and for some distance beyond, Makangeni. This rock is especially noticeable in slabs of some 3 feet long, 18 in. by 12 in. (roughly), which are easily levered out of the ground. I utilised it in building the fort at Makangeni, and it would form admirable building-stone. Beyond this the country is all of a granite formation, and the bed of the river of sheer rock. Associated with the granite are great quantities of crystalline quartz, and in some localities this quartz bears every resemblance to that which usually yields gold. Limestone also alternates with the granite, and is in close proximity. I have found fossils in this limestone. At two points—one (if not both) singularly adapted to the working of metals, especially as there was a considerable water-fall in the bed of the river—I found copper in its sulphate form contained in malachite and quartz. I trust this may prove a valuable discovery for the Company, there being in close proximity a fall of water, so as to render mining operations feasible, and a waterway to the Coast. Mr. Wilson also found plumbago. The specimens I have brought together, with some samples of what I believe to be an extremely rich iron ore, I will send to England, that an expert's opinion may be obtained on them. The timber of the forest-land along the Sabaki is worthless. The trees are almost entirely of a spongy-wooded class, such as the baobab, etc., or scraggy and dwarfed acacia and other thorn-trees. The former compose most of the jungle, and are useless for timber, and almost useless even for fuel. But along the margin of the river there grows a tree with fine white timber, very straight, and sometimes with a diameter of two feet and more. Here, too, at various points there are enormous acacias, with fine boles of three or four feet diameter, of course yielding excessively hard timber. Both would be useful for local building purposes. The river, I consider, should be navigable for canoes at all seasons up to the site of No. 2 Stockade, and this mode of conveyance would afford a very great saving. The first desideratum is to cut a road through the jungle feasible for animals, and planned to touch the river only at certain points, instead of following its windings round every bend, which will greatly reduce the distance and the difficulties of the route."

Captain Lugard's caravan was absent for about six months, during which time the transport-animals were taken over 80 miles, roads were cut, and six forts were built between the Coast and Muchako's.

Mr. Jackson's report takes up the thread of our narrative at Muchako's. He left that place, on 6th August 1889, with 535 men and 22 donkeys, and set out for the Victoria Nyanza. His report is too voluminous to give *in extenso*, otherwise we should have been glad to have availed ourselves of so valuable an itinerary of travel. The map which accompanies it is carefully drawn and full of detail, though its value is discounted by the absence of latitudes and longitudes.

The route taken by Mr. Jackson's caravan was through Kikuyu, past the northern end of Lake Naivasha, and *viâ* Sotik and Lumbwa to Kavirondo.

The whole country between the Ukambani hills and the afforested lands of Kikuyu is described as an extensive, undulating, treeless, and grassy plain abounding in game. It was formerly occupied by the Masai, who were, however, driven away by the Wakamba and Wakikuyu. There are immense tracts of undulating land which, having been cleared, are now under careful cultivation. Indian corn, *mtama*, *wimbi*, sweet potatoes, yams, *bazi*, beans, bananas, and sugar-cane, all flourish in abundant quantities, and are very cheap. The natives keep a few cattle, but sheep and goats are more plentiful. Kikuyu, indeed, appears to be a land of plenty, and to be densely populated. "The soil is so rich," says Mr. Jackson, "that everything flourishes most luxuriantly, and I should imagine that most of our English fruits and vegetables would thrive. Tobacco of a superior quality to that grown on the Coast and in other parts is cultivated in large quantities and is very cheap." The natives are of an excitable disposition. They all speak Masai, besides a language of their own, and most of them adopt the Masai dress. They have no dominant chiefs, and their government appears to be patriarchal in character.

Leaving the fertile plains of Kikuyu behind, the caravan passed through the difficult forest-lands, staying for a time at Mianzini to collect a stock of food, and, with varying fortunes incidental to such a march, eventually entered Kavirondo, and reached the Victoria Nyanza (26th October). Kwa Sundu (now known as Mumiya's) was reached on 7th November.

"Here," says Mr. Jackson, "we found a Waganda messenger with letters from Stokes and Mwanga, asking us to go to his assistance. On the 9th I sent off answers to these letters, and sent three of our own men (all Waganda) with them, and decided to give them thirty days to get there and back in. Mumiya, the chief of the town and district, gave us a large corner of his village to camp in, as it is the custom of the country for caravans to camp inside. In some respects it has its advantages, in others it has its drawbacks, but by going inside, provided it is clean, you have a certain amount of hold on the people and their belongings. Mumiya is a young man, and is chief of the district only in name, as he has little or no influence outside his own village, and but little even in that. He, however, is most anxious to keep on good terms with the Company, and if a European were sent to back him up and give him good advice, he might be made something of, and the people would soon acknowledge him as their chief. Soon after our arrival our

cattle began to die in threes and fours daily from some kind of lung disease, which killed them off in a few hours. They would leave the village in the morning apparently in the best of health, and in a few hours would be brought in dead. On examination the lungs were always found to be inflamed, and full of a greenish-yellow slime. Curious to say, although it appeared to be very infectious among our own herd, it never spread to the Kavirondo cattle. The natives, however, came in from far and wide with flour and potatoes in order to get the meat, it did not matter in what state of decomposition it was in. As long as meat of any kind was obtainable they would not look at beads, etc. From the 8th November to the 10th December the entire caravan was fed with flour, potatoes, etc., bought with the beef of our dead cattle, four elephants, and hippos. Of the latter there are great numbers in the river Nzoia. Elephants come down at certain seasons in small herds, and do great damage to the crops at night, and lie up in the long grass which we passed through on our way from the south in the day-time. Here Mr. Gedge and I managed to bag four between us, and also succeeded in capturing a small bull-calf, which we carried some six or eight miles into camp slung between two poles. In a few days he became quite tame and throve on milk and boiled potatoes, but most unfortunately, during the cold, wet, windy weather in May, he caught cold and died of inflammation of the lungs.

"Leaving Mumiya's on the 10th we crossed the river Nzoia and entered Kitosh. This is the principal slave and cattle visiting-ground of the Swahili and Arab traders. These traders go up to Kavirondo simply for this reason, and because food is cheap. A caravan will go to a place like Mumiya's and stop there for several months, living at the expense of the good-natured and hospitable natives. In the meantime they will have been on two or three raids into the Wanipi country, between Mumiya's and Masala, on the Lake (all slaves falling to them as their share), and when their time is up, knowing they have no spare men to carry food, as they have a large stock of ivory buried at Njemps or Kamassia to carry down to the Coast, they return to Baringo, *vid* Kitosh, Maragwet, at the foot of Chibehingnani and Elgeyo, stealing all the cattle as food, and kidnapping all the women and children they can. We had relied on getting food every day as we went along in Kitosh, to save our breaking into the food we were carrying, a matter of four days out. Directly we approached the first villages we found all the doors barricaded, and every one in a great state of alarm. At camp, just outside the village of the principal chief, Majamja by name, we tried to induce the people to sell us food, but were unable to do so, and the women could not be induced to come into camp. At one village we were told by the headman that his people were really too frightened to come and sell us food, as they had been so harassed and treacherously treated by the Swahili. Their custom is to protest the greatest friendship for the people, and encourage the women and children to come into camp by giving good prices for their flour, etc., and turn at a given signal to surround the camp, secure all the women and children, and shoot down any men who may offer resistance. Fortunately for us, we had a good supply of food with us, so were independent. These people are periodically visited by raiding bands of Masai and Wa-Nandi. The country is fairly well cultivated, *mtama* and *wimbi* being the staple food, besides a few bananas. The cattle, which mostly belongs to the Wakwavi, are much finer than those at Mumiya's. This is probably due to the country being higher and cooler, and the grass of a better quality. Iron ore is plentiful in places, and worked by the natives, and used for hoes, etc., in preference to the iron wire brought from the coast. Outside most of the villages there are one or two smelting furnaces. Our path led us through alternate patches of cultivation and bush,

over several small streams, one fairly large one with a rough native bridge thrown across. We saw ample proof of the Swahili and Arabs' raiding—wrecked, burnt, and deserted villages being passed every day.

"*Oct. 13th.*—We left the inhabited district of Kitosh, and struck into the wilderness, skirting along the eastern slopes of Mount Elgon. The country is very undulating, and for the most part covered with thorn-trees, bush and long grass, the latter burnt at this time of the year by the Wandorobbo of Elgon. Water is plentiful everywhere in small streams, and delightfully cool; game, when we passed, was rather scarce and wild, but during the wet weather, judging from the old tracks, the whole country must be alive with buffalo, etc., and a fair amount of elephants. The latter were just coming down from Elgon. Mr. Gedge and myself, at different times on the march, bagged four. Unfortunately, as we afterwards found, the Suk Wandorobbo, who hunt all over this district, kill indiscriminately every elephant they come across, even the smallest calves.

"On the 21st we met a small party of Suk Wandorobbo, the only people inhabiting this wilderness. At this point the hills were very rough and stony, with beautiful white quartz showing through the surface and scattered about in loose places; but, although we kept our eyes open, we saw no traces of gold.

"*Oct. 22d.*—At this camp we stopped a day to buy ivory from the Wa-Suk, and bought two or three small tusks and one large one of 70 lbs., the latter damaged, for which we paid one ring of brass and 3 strings of beads. Ivory throughout this country is very cheap, a good 15 lb. tusk for 6 strings of beads, and so on; but a great deal of it is unfortunately damaged by being left exposed to the sun, close to where the elephant is killed. The people have no use for it excepting to make armlets, etc., and, as caravans have rarely been into the country, there is nothing to induce the people to take care of it. There is no doubt that these people kill great numbers of elephants in a year, and will soon learn to see that it will be to their own advantage to take better care of them. No food of any kind is procurable from these people, who live entirely by hunting elephants, etc., which they kill with small spears. Buffalo and other game they catch in most ingeniously made traps, which they set in the paths leading to water-holes, or under the shade of some tree, much frequented by the game during the heat of the day. When game is very scarce some of them eke out an existence on a small species of rat, which swarm all over the plains in thousands, and which the women dig out of their holes with a piece of hard wood. These rats, tamarind and other fruit, must form their principal food at this season, as game was very scarce and wild at the time we were there. The men wear their hair worked up with some kind of fibre, grease, and clay, into a huge flat bag; some reach down the back to a level with the bottom of the shoulder blades, on the under-side is a pocket in which they carry all their odds and ends. A strip of skin and a few strings of beads round the waist, a thick, solid ivory bracelet and armlet, and a few brass rings in their ears, is all the men wear. All carry a small oblong shield with projecting corners made out of buffalo or giraffe hide, and a neatly-made spear or two, which they either throw or stab with, according to circumstances. The women dress very decently in skins, with strings of beads and plain rings of brass wire round the neck and waist.

"*October* 23 to 31*st Dec.* 1889.—Leaving the rough, stony hills, we dropped down on to the barren plains of Turquel, and encamped on the river Angalul. As our guides had told us we should only take nineteen days, or rather marches, to get to Ngaboto, and we had already been thirteen, and we were told we could not rely on getting much at Ngaboto, we sent in three headmen and 130 men into Save, a small

district on the northern slopes of Elgon, where food was reported to be plentiful. In the meantime we managed to keep the men on meat, although the game was so scarce and wild from being constantly hunted by the Suks.

"Fish were very plentiful in the river, and had we been supplied with a net we could have caught any quantity of them. I will take this opportunity of suggesting that every caravan going up into the Interior should be supplied with a good fishing net, as there are few things the men like better than a fish diet occasionally. The heat during the whole of the time was very great, and more trying than any other place we had passed through. The whole country, which is a vast wilderness of bush and scrub, was dried and burnt up, with no shade whatever except in the narrow belt of sycamore, fig, and other trees which bordered the banks of the river. Ivory was very cheap all through this country but not plentiful, but this is not to be wondered at, as a Swahili caravan had passed through only a few months before us.

"*January* 1, 1890.—On January 1st our men from Save returned with eighty-four loads of food, and on the 3d we left camp and followed the river Angulul all the way to Ngaboto, where we arrived on January 11th. The country was the same lonely, barren wilderness, growing nothing but thorn-trees and bushes, aloes and coarse grass, at present mostly burnt. On the 7th we got into the district of Kirakow, where the country becomes more hilly and mountainous, and is inhabited by the Wa-Suk, who, however, keep cattle, goats and donkeys, but will not sell any. On the 9th we came to a cañon, with steep, precipitous cliffs on both sides, through which the river, in this district called the Suam, roars for a couple of miles or so. This necessitated our leaving the river, and climbing up some 1500 feet on to the top of the ridge, dropped down on to the Ngaboto plains by the worst and most terribly steep descent we had as yet met with. From the top we got a good view of the surrounding country in front of us, which was really more barren and desolate to look at than Turquel. The belt of trees on both banks of the Suam, and the broad belt of dark green, some 13 miles off, running north and south, were the only things to break the monotony of this barren waste covered over with thorn trees, bush, and aloes.

"About half-way between the hills and Ngaboto the river loses itself in the sand, and water is only procurable by digging in the river-bed.

"*January* 11.—Immediately on our arrival at the Ngaboto river, we heard the natives set up their war-cry (which is very like the barking call of the zebra), but took no notice of it, as it was not at all to be wondered at that they should be frightened, as we thought, at the approach of so large a caravan. In a few minutes a small party of some fifteen men came up, and showed us to the camp usually occupied by caravans, also where to get water in the river-bed. After this we saw no more of them, although they said they would bring in three tusks of ivory they had to sell us, and no one suspected for a moment their treacherous intentions. Just at dark, however, a porter came into camp to report that another man who was with him had been speared and killed by the natives. At the same moment cries for help were heard from two different quarters, and in a few minutes another porter was brought into camp with a spear through his arm, thrown by a native whilst he was scraping a hole for water in the river-bed. Askaris were sent out to bring in the body of the man first killed, but were unable to find any trace of the third man. On making inquiries, three men were missing from their messes, and were never seen again, and most undoubtedly were all murdered in revenge for Count Teleki having allowed his men to steal and loot in this place, and for raiding further south. All hopes of going north into the Turkana country

and Lake Rudolph were knocked on the head, as we had relied on getting a certain amount of food at Ngaboto, and were entirely dependent on the natives for guides, both of which were out of the question, and as we knew that the last caravan up here had lost some fourteen or fifteen men in the same way at Mgamataka to the N., it was evident that the people were up in arms against us, and, as there was nothing to be gained by going on, we decided to turn back. The people having no villages, cattle, or goats, and their crops being all in, there was no way of retaliating on them. Next day (12th) we began to retrace our steps. About a mile from camp we found traces and the remains of one of the three missing men, who had been murdered in the bed of the river. The natives followed us all the way to camp, and hung about all next day in hopes of picking off some of our men, but we saw very little of them, only an occasional glimpse in the thick bush. On our way back we took the same track as we went by, picking up a few tusks of ivory from the natives, who came into camp in twos and threes, and left immediately they sold their ivory, instead of staying for several hours, hobnobbing with the men; but we thought nothing of it.

"On the evening of the 25th a porter was reported missing from camp, and on the following morning a party having been sent to search for him, found his remains and the place where he had been murdered. He was evidently quietly eating some tamarinds behind a big stone when he was surprised and killed. The murderer had been unable to unfasten the buckle of the man's belt, and had cut it with his spear, leaving blood marks on the part cut, and had taken away the buckle, leaving the belt. He also took the man's pouch, rifle, and loin-cloth. As this sort of thing could not be tolerated, two parties of men were sent out to punish the people in the vicinity. Several natives were killed, and 32 women and children were brought in prisoners, and six donkeys were also captured. On questioning some of the women they at first denied all knowledge of the men having been murdered, until the belt was produced with the blood-stains on it; they then confessed that they not only knew about it, but knew the men who did it.

"On the following day, when on the march, two men came in to sue for peace, and at camp several more came in, but, as these people are evidently a treacherous lot, and not to be trusted, it was not thought advisable to release the prisoners until we were clear of the country, and they accompanied us as far as the river Kilim, to the north of Elgon, when ten small tusks of ivory were brought in by their friends as a ransom. These we took, but gave them back the value in beads, etc., and, before leaving, gave each woman and child a present of beads and some food. The whole country to the north of Elgon, as far as the eye can see beyond Mt. Lekakisera and towards Mt. Dabasien, is a bare, barren waste, with a little bush and a small belt or two of trees, marking the course of some stream. On February 4th, we climbed up some 2000 feet to the foot of the mountain, and entered the small inhabited district of Save.

"We had come this way for two reasons: first, we had no food to take us back to Mumiya's, the men having been on very short allowance for some time, and second, ivory was reported to be plentiful. On the way up we saw a good-sized lake in the distance, some thirty odd miles off to the NW., which we have named Lake Salisbury. The people of Save appear to be an off-shoot of the Wakwavi, both men and women adopting the same dress, and speaking the same language. They also have a language of their own. Their houses are, however, quite different, being round instead of oblong, and made of strong wickerwork and plastered inside with mud; the roof, which is nearly flat, is covered with earth. They cultivate *wimbi*, pumpkins, bananas, yams, and a small species of long thin

potato, etc. Honey is plentiful, and of a superior quality. They also keep cattle, sheep, and goats, but of late years have been so harassed by the Masai and Wanandi that we heard they contemplated leaving the place and settling on the other side of the mountain, near Kimangichi. Whilst we were there, a large raiding party of Wanandi came down, on the other side of a spur to the W., and carried off some 300 head of cattle, besides killing a lot of people and burning their villages. We offered to assist the people, but they refused. Iron wire and cowries are the only barter-goods demanded by these people; their ivory, which they get from the Elgon Wondorobbo, we could not buy, as they wanted cattle for it, a thing we did not possess.

"After laying in a stock of food, we left Save on the 13th, and began the ascent of the mountain. Between 6000 and 9000 feet, we passed through dense forest and clumps of bamboos. At above 9000 feet we left the forest, and entered the open, with bushes of various kinds dotted about, heaths and coarse grass. From 11,000 to 13,000 feet a curious tree, with a straight, rough stem and a large leaf, grows in abundance. On the 17th we entered the crater, some eight to nine miles in diameter, and camped inside that night. The bottom of the crater appeared to be very boggy and swampy; here the river Angalul rises and flows through the exceedingly precipitous break in the side of the crater; also the river Sum, flowing NW. into Lake Salisbury. Next day we left the crater. I should never recommend another caravan attempting to cross over the mountain (although it is undoubtedly a short cut) as the cold is too great for the men. Fortunately for us, we had no rain, otherwise we should probably have lost a great number of our men. As it was, only two sick men died from the cold and exertion. The highest point reached was 14,094 feet (boiling-point), by Mr. Gedge and myself, and, as far as we could make out, none of the other peaks were more than 50 feet higher. On the south side of the mountain the vegetation is much more luxuriant and the forest thicker, most of the trees being much finer. At 7500 feet we came to the first cave, and were told by our guides that the inhabitants had all been killed by the Wanandi. Inside we found about thirty huts, oblong in shape, and built on the same plan as the Masai or Wakwavi. What could have led Thomson to suppose that these caves are artificial we all failed to see, and were unanimous that there is absolutely nothing about them to suggest that they are the work of man. Several others were passed at different elevations, but none inhabited, and it was not until we were clear of the forest, at about 6000 feet, that we came to a small inhabited district; some of the people were living in huts dotted about on the mountain side, but most of them living in caves. From these people we were only able to get a very little food, so skirted along the foot of the mountain to the west, and arrived at Kimangichi, a small district called after the name of the principal chief. Here food was plentiful, *wimbi* and *m'tama* flour, bananas, beans, pumpkins and honey, all fairly cheap. Kimangichi was most friendly, and one of the most intelligent men we had met with. He told us he and his people formerly lived in several villages at the base of the mountain, but had been driven out by the Wanandi, and since then had been afraid to leave their caves. On the 28th I exchanged treaties with him, and gave him the Company's flag. On March 1st, we left the mountain, and on the 4th reached Mumiya's."

We have quoted at length Mr. Jackson's account of his flying visit to Ngaboto, and of his ascent of Mount Elgon, on account of its exceptional interest and topographical value. We cannot follow him so closely in his journey through Usoga to Uganda. With regard to the value of

Usoga, Mr. Jackson says:—"Comparing Usoga with Uganda, I believe that the former is the richer of the two. The greater part—in fact nearly all—of the ivory in Uganda comes from Usoga and Unyoro, the latter being very rich. Elgumi, to the north and north-east of Usoga, is another country very rich in ivory, and can easily be opened up from Wakoli's place." Mr. Jackson speaks of Wakoli in very favourable terms, and he left his station in charge of a headman, with 32 men, 31 loads of goods, 21 rifles, and 300 rounds of ammunition.

The medical report by Dr. A. D. Mackinnon refers to his experience of the climate in the following terms:—

"Taken as a whole, the climate, so far as one can judge from simply passing through, is, for Africa, very healthy. Most places, at the months we visited them, were dry, the heat nowhere being excessive during the day; at night it was always pleasantly cool, with the exception of Mianzini, where it was often frosty at night, and the higher mountainous parts, where it is decidedly chilly. Malarial poison is almost entirely absent, even on the lower grounds and about the lakes. Everywhere the natives look strong and robust, which is always a good sign of the country. From the coast to Ukamba, at Muchako's, which I have seen in the months of December, January, and August, it is dry and fairly hot. During rainy weather, the air was warm and moist during the day; at night it was often cold and chilly, also in the morning till about nine o'clock. During the other months it is often chilly during the day, the mornings being misty and cold.

"Kikuyu.—On both occasions we were here in the month of August, when it was misty, cold, and wet.

"Naivasha Lake and plains were fairly hot and dry.

"Mau Escarpment.—During September and October it was very wet and cold, especially inside the forest.

"Sotik, Lumbwa, and Burgomese.—Fine, slightly moist and warm air. We were there in October.

"Lower Kavirondo and Lake Victoria.—We passed here in October, when it was rather hot and dry.

"Upper Kavirondo.—I saw this country during the months of November, December, March, April, May, and June. In the dry season the heat during the day is slightly oppressive and dry; at night, however, it is pleasantly cool. During the rains in March to June it is cooler; rain falls in heavy showers either in the afternoon or morning, but from the nature of the country it soon dries up, leaving the air cool and not excessively moist.

"Karamojo and country around Mount Elgon to Ngaboto.—These, during December, January, and February, were rather hot and very dry.

"Usoga.—I was here in March, when the rains were on, when it was rather hot and moist, the air not circulating very freely, owing to the large extent of banana plantations.

"Kavirondo to Baringo, July.—Dry, but pleasantly cool during the day; at night often cold.

"Baringo to Naivasha, July.—The plains here were cool and pleasant, the air being dry, very heavy dews falling on some nights."

As regards drinking-water, which is so important a consideration for caravans, Dr. Mackinnon reports:—

"In Kikuyu the water is good. At Mianzini it is fair, but comes from a small

swamp. From here to Lake Naivasha it is fair, coming from a weakly-flowing spring (Langora). The water of the lake is very good for its nature. On Mau the water is excellent after the places occupied by Masai villages have been passed, as there the cattle spoil it. In Sotik and other districts, to Lower Kavirondo, the water is good. In Lower and Upper Kavirondo, the water suffers from the number of villages in the districts and the cattle. In Karamojo and about Mount Elgon the water is very good. At Ngaboto it was scarce, and had to be dug for in the sandy bed of a river, but was not bad. In Usoga the water was good, being chiefly from streams and springs. From Kavirondo to Baringo it is everywhere good. From Baringo to Lake Naivasha it is also good, especially that from the hot springs in and near Doreta, where it has to be cooled for drinking purposes. From Naivasha to Kisidong there was none when we passed. At Kisidong Mkubwa it comes from a hot spring and is very good. From here Kikuyu is again entered."

The health of the European members of the expedition was, throughout, excellent. The Swahili, on the whole, enjoyed good health. The total number of deaths from disease was twenty-one; seven died of dysentery, and four of blood-poisoning. Attacks of dysentery were ascribed to the occasional short allowance of food; the fevers seldom prevailed for more than three days, the usual course being one day.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The Rev. Dr. Stewart read the paper we publish this month, on "South Africa: Past and Present," at a meeting in the Society's Hall, Edinburgh, on 26th February. Mr. A. L. Bruce, Hon. Treasurer of the Society, presided. A cordial vote of thanks was awarded to the lecturer on the motion of Dr. George Smith.

Dr. Stewart repeated his lecture at a joint meeting of the Glasgow Branch of the Society and the Philosophical Society of Glasgow, on the 11th March. Mr. Renny Watson, Chairman of the Branch, presided; and Dr. Muir moved the vote of thanks to the lecturer.

A meeting of the Society was held in Edinburgh on 19th March—Dr. John Murray, Vice-President, in the chair. Colonel Sir Charles Wilson, R.E., K.C.B., Director-General of the Ordnance Survey, read a paper on "The Ordnance Survey: Its Methods and Processes." On the motion of Sir Douglas Maclagan, seconded by Sheriff Æneas Mackay, a cordial vote of thanks was awarded to Sir Charles Wilson.

GEOGRAPHICAL NOTES.

ASIA.

The Peninsula of Kamtchatka.—Though this country passed in 1696 into the hands of the Russians, it is still one of the least known parts of their empire. Professor Umlauft (*Deutsche Rundschau*, xiii. Jahr. Heft 3) gives its area as 104,200 square miles. It is traversed along its whole length by a mighty chain of mountains, which rise into the regions of eternal snow. On the eastern side are numerous volcanoes, of which twenty-one are now active. Dittmar's map (1850)

shows only twelve active volcanoes, from which it may be inferred that the subterranean forces have developed a large amount of energy since his time. At the southern extremity of the peninsula numerous isolated volcanic cones rise from the low ground, of which the Apatcha only is active. To the north of this mountain the country begins to rise, and at length two chains are formed, of which the western extends through the whole peninsula. Only one volcano, the Icha, is situated actually within the range, but several others lie between it and the western coast. Below the 57th parallel the river Tigil has eroded a narrow valley through the range, and a little further north a deep depression interrupts the continuity, but the elevation soon increases again, and is continued in the Voyampolka Mountains. The eastern range is far shorter, extending only to the 55th parallel. It also contains only one volcano; but the short range which runs off from it in a south-easterly direction to Cape Shipunskie contains several, among them the Koryaka, which attains a height of 11,218 feet. They are particularly numerous in the elevated country which adjoins the eastern range and entirely fills the space between the middle and lower Kamtchatka River and the eastern coast. Here stands the Klutshef, the culminating summit of the peninsula, 15,757 feet high. On the left bank of the Kamtchatka the Timaska, a low chain with rounded summits, runs eastward, and is joined on the north by the Novikofskaia Vershina, ending in Cape Stolbovi. Beyond the 57th parallel northwards there is only the one range. Numerous hot springs testify to the volcanic character of the eastern part of Kamtchatka. Dittmar found the temperature of a spring near the Mikishina to be 120° F. on December 16th, when the temperature of the air was −11°. Owing to the great atmospheric moisture and the abundant rainfall, the country is irrigated by numerous rivers, of which the Kamtckatka is the largest. The Shupanof, on the east, and the Bolshaya, Icha, and Tigil, on the west, are also important streams. The climate is changeable and severe, and much colder than that of countries in the same latitude on the other side of the Old World. When Dittmar visited the country, there was ice in May on an inlet of Avatcha Bay, and on the west coast, which is much colder, the thermometer stood at sunrise on August 2d at about 34° F. In winter, temperatures of −40° and lower were recorded. The snow-line lies at a height of about 5300 feet.

In Kamtchatka, as in Central Siberia, the vegetation is surprisingly exuberant. Rich meadow-land alternates with dense woods, composed, in the south, of poplars willows, and birches. Where the woods are thin, bushes grow freely, and flowering plants bedeck the ground. Wild animals are abundant, and hunting and fishing are the chief means of procuring food. The most important game are wild reindeer, wild sheep, hares, otters, sables, and ermine. Bears, wolves, and foxes are also numerous. Of birds, heathcock, swans, geese and ducks, and sea-fowl may be mentioned. In the southern rivers salmon is plentiful.

The southern part of the peninsula is inhabited by Kamtchadales, numbering some 4000 souls. They have submitted to Russian influence, and are Christians in name, but still cling to the rites of Shamanism. Their mud huts have given place to houses, round which gardens are laid out. They keep cattle and a few horses and fowls, but neither sheep nor pigs. In the north about 3000 Koriaks live, who are still in a primitive state, and subsist on the produce of the chase and fishing. Their most important domestic animals are dogs, which draw their sleighs.

The Date in the Philippines.—Freiherr von Benko, Captain in the Austrian Navy, has published a pamphlet, in which he calls attention to the singular fact

that until half a century ago the inhabitants of the Philippines were a day behind those of neighbouring countries in their reckoning. It is easy to understand that the time on the meridian opposite to ours must differ by 12 hours, but who shall say whether those twelve hours are to be added or subtracted from our reckoning? Practically this has generally been settled by the first discoverers, according as they sailed eastwards or westwards. Legaspi, the conqueror and coloniser of the Philippines, sailed to the islands from the east, and brought what may be called the *eastern* date with him. Later on, however, when the Pope divided the world between the Spaniards and the Portuguese, giving the former the half lying beyond a meridian passing 100 leagues west of the Azores (afterwards removed to 370 leagues) the islands, owing to the inability of navigators in those days to calculate the longitude with any approach to accuracy, remained in the hands of the Spaniards, and the date was changed to that of their American possessions. But, in 1844, the Governor-General of the Philippines decreed that "considering it convenient that the mode of reckoning days in these islands shall be uniform with that prevailing in Europe, China, and other countries situated to the east of the Cape of Good Hope, . . . I ordain, with the assent of His Excellency the Archbishop, that, for this year only, Tuesday December 31st be suppressed, and that the day following Monday the 30th of the same month be styled Wednesday January 1st 1845." That the date has been made to conform with that of Eastern countries is a circumstance not generally known, as Freiherr von Benko proves by quotations from geographical authors and encyclopædias, among others Meyer's *Konvers. Lexikon.*

The Arctic Route to Siberia.—At the end of last July two ships and a tug left London, and, though detained by the ice, which was driven by the north-easterly winds into the Kara Sea in exceptionally large quantities, reached Karaul, 160 miles up the Yenisei, without accidents. After remaining there for nineteen days, they made the return voyage in twenty-six days, having, therefore, been absent eighty-four days. The real difficulty lay in ascending the river from Golcheka to Karaul, which the Russian Government had assigned as the port of discharge. In 1889, Captain Wiggins did not venture to take the *Labrador* up, because he thought that the water was too shallow, and he had no steam launch to lead the way. It was found, however, that there was a channel with sufficient water for vessels of any draught. Professor Nordenskiöld, in a letter congratulating the promoters of the undertaking, declares that this successful voyage will hereafter be regarded "as an event rivalling in importance the return to Portugal of the first fleet loaded with merchandise from India."—*Nature*, Nov. 27th, 1890.

AFRICA.

Mount Kénia and the Surrounding Region.—The *Ergänzungsheft* No. 99 of *Petermanns Mitt.* is a detailed description of the country traversed by Count Teleki and the author, Lieutenant von Höhnel, in the expedition of 1887-88, when they discovered the Rudolf Lake. Notes on Kilima-njaro and Ugweno, from Dr. Meyer's reports, have appeared in our Magazine in Vol. VI. pp. 156 and 261; and the basins of the Rudolf and Stefanie Lakes are described in Vol. V. p. 665, from an earlier report of Lieut. von Höhnel. The present extract will, therefore, treat only of the Kénia region and its connections with Kilima-njaro on the south-east, and Samburu on the north-west. Were the crests removed, the continent of Africa would be found to maintain a slope from the Indian Ocean to a culminating point, over 7000 feet high, situated near the Equator in long. 36° E. Following this slope, a flat plain extends north-westwards from Kilima-njaro, and is bounded on the north by a

series of ranges, the Ngatuk, the Doenye Erok la Matumbate, the Tumoké and the Naebormutu, while on the east it is limited by the Julu chain and the outliers of the Ulu mountains. The ranges to the north rise to a height of about 6500 feet, and the Tumoké and Naebormutu are succeeded by the Mavarasha and Gurugeish ranges, after which this metamorphic group is terminated by the relatively low Doenye Mellevo. On the east a strip of low flat land separates it from the Ulu highlands, which stretch northwards from the Julu range to the foot of Kénia, where they terminate in the Kyanjabi mountain, 6500 feet high. Their eastern flank is skirted by the river Azi. The rock of which they are composed is gneiss, and the ground is in general sandy and stony, and cultivation is possible only in the moister and more fruitful valleys. Near Turuka, to the north of the Doenye Mellevo, the route begins to ascend up to a vast plateau, which extends to about the parallel of 2° N. lat. After passing the Doenye Erok la Kapotéi, a flat-topped elevation of such large extent as almost to deserve the name of plateau, and the Doenye Lamuyo, a long mountain with several summits rising to a height of 6800 feet, the top of the plateau is reached. It extends over all the wide region known as Leikipia, and to the north and west has an elevation of 6500 to 7800 feet, while on the other sides it is only 4900 to 5800 feet high, except where, on the eastern side, Mount Kénia towers above it. To the west the plateau descends by huge steps to the great depression which runs nearly north and south through Central Africa, while on the east it sinks down by imperceptible gradations. On the former side stand several chains of mountains, the Subugia and Dondole mountains to the south of the Equator, and the Marmanett on the northern side. The southern part is occupied by an extensive group of mountains, named by Joseph Thomson the Aberdare Range, rising in the south to a height of 13,000 feet, and here called Settima. To the west of the range stand two isolated mountains, the Goyito and Kinango, both about 13,000 feet high, and between it and the Dondole mountains lies a depression, 30-36 miles long from north to south and 11-15 miles broad, where excellent pasture-land abounds. Here stands the swamp Kope-Kope, which gives birth to the Guasso Narok.

Kénia is a huge truncated pyramid, supporting a precipitous rocky pinnacle. Its flanks rise more gently and more uniformly than those of Kilima-njaro, until a height of about 15,000 feet is attained, and then pass suddenly into the walls of the rocky summit, 2600 to 3000 feet in height. The explorers ascended the mountain to a height of 15,350 feet, about the edge of the crater, and estimate the total height at about 18,400 feet. The base on which the mountain stands has a considerable dip to the east, the western foot standing at an elevation of about 3300 feet and the eastern at only half that height. This base is encircled by a narrow belt of forest, composed of trees taller and stouter than those that grow on Kilima-njaro. At a height of 8500 feet an almost impassable belt of bamboo takes its place, which at a height of about 10,000 feet breaks up into solitary clumps and soon after disappears, the upper slopes of the mountain being carpeted with moss, the *Senecio Johnstoni*, and the varieties of *Lobeliaceæ* characteristic of Kilima-njaro. These are found nearly up to the limit of eternal snow, which on the west side is met with at a height of 15,000 feet, and on the east side 300 to 400 feet lower. The snow-limit, then, lies lower than on Kilima-njaro, though the latter is further from the Equator and nearer to the coast. The pinnacle already mentioned rises on the west side of the broad flat pedestal. It is a fragment of the crater which remained standing after the rest fell in. The circular base of the crater encloses a caldron-shaped hollow, filled with snow and ice to a depth of 600 to 1000 feet below the edge. On the east side masses of ice extend beyond the crater-walls, but on the west the rocks are so steep that the snow lies only in a

few favourable spots, giving the mountain the appearance to which it owes the Masai name of Doenye Egere, or "Spotted Mountain." The pinnacle is divided to a depth of 300 feet from its summit by a great cleft, and rises in two rocky pillars —probably the two horns alluded to by Krapf. The south-eastern slope of the plateau is drained by the Kaya, as the upper course of the Sabaki is called, which, flowing round the Kyanjabi mountain, skirts the eastern side of the Ulu mountains, where it is named Azi. Around Kénia flow the streams which feed the Tana. On the south the Sagana collects the water from numerous rivulets which descend from that mountain and from the Aberdare chain, while on the north the Guasso Nyuki adds its waters to those of the Guasso Narok, that flows out of the Kope-Kope swamp, to form the Guasso Nyiro. This river follows the eastern edge of the plateau to 45′ N. lat., and, falling 2600 feet in a distance of 56 miles, rushes violently between its steep banks, forming cascades and rapids. Then it turns eastwards, flowing more gently for a distance of 22 miles, when it takes a south-easterly direction and forms the Lorian swamp. On emerging from this swamp it receives the Guasso Nagut, an important Kénia stream, and under the name of Kilaluma enters the Tana.

From the north of Kénia to the Kulall mountain, near the Rudolf Lake, in lat. 2° 30′ N., primitive rocks again appear. The first chain is the Doenye-lol-deika, which extends from the foot of Kénia northwards, and attains a relative height of 1000 to 1300 feet. Its name signifies "Lock Mountain," and is given to it by the Masai because it has the appearance of a lock of hair hanging from Kénia, the head. Further northwards a succession of isolated summits, among which the Ngarroni rises to a height of not less than 10,000 feet, and the Lengiyu range skirt the eastern edge of the plateau, and mark the boundary of the volcanic deposits. To the west of the latter lie the Loroghi Mountains, a single chain surrounded on all sides by the plateau, which has here an altitude of 7500 feet, and extending in a north-westerly direction for about 37 miles. It is separated on the north-east by a narrow strip of plateau from the Murkeben and other ranges, which continue the line of elevation of the Lengiyu, and are known collectively as General Matthew's Chain. The relative height of this chain remains almost constant, but the absolute height increases from 6500 feet in the south to 10,000 feet in the summit of the Nyiro Mountain.

Lieutenant von Höhnel gives a table of altitudes. According to this the height of the Rudolf Lake is only 1312 feet, and of the Stefanie 1738 feet, which are much less than those given in his former report, before the aneroid readings had been corrected for temperature, etc.

A large part of the country is uninhabited, for it is in general dry, and the number of streams is small. The ground consists to a large extent of volcanic rock of recent origin, and the process of weathering advances slowly. In some parts the land seems to be approaching the condition in which the Sahara now is. In a long chapter on the ethnography of the region traversed Lieutenant von Höhnel discusses the native inhabitants, their habits, and industries.

The Mobangi.—Details are given in the *Mouvement Géographique*, March 8th, 1890, of Captain van Gèle's latest ascent of this river. He left Leopoldville on May 21st, 1889, with two steamers, the *En Avant* and the *A.I.A.*, and, having touched at Bangala, ascended the river without any mishap to Zongo, where he established a station. In ascending the rapids, a little below Mokoanghay, the *A.I.A.* was nearly lost, and the tender which went to her assistance crushed to pieces. Leaving a small detachment to hold a post at Mokoanghay, Captain van Gèle rounded the great bend of the river, and came to the important village of

Banzy, where the natives manifested the greatest pleasure at seeing a white man, and speedily raised a mud hut for his accommodation. On his way he passed two tributaries on the right bank, which he ascended to a certain distance. The first, the Kwango, descends from the north-east, and enters the river immediately beyond its most northern point. At its mouth it is 197 yards broad and 13 feet deep, and flows with a velocity of about $2\frac{1}{3}$ feet per second, so that its discharge is nearly 18,000 cubic feet per second. Captain van Gèle could not advance further than 68 miles from the mouth, owing to a barrier of rocks. The Benghi is a smaller stream, 65 yards broad and 18 feet deep at its mouth, and with a velocity of 4 feet per second, which, flowing from the north-north-east, enters the main stream a little below Banzyville. Being tortuous and encumbered with fallen trunks, it could not be ascended further than three miles.

Having laid in supplies at Banzyville, the expedition made a fresh start on December 7th, and on the 12th reached the mouth of the Kotto. On this occasion the natives showed no hostility, and the steamers ascended the Kotto for a distance of some 12 miles, through densely peopled country, to Bendé, the residence of Ganda, a chief of the Sakara. Captain van Gèle endeavoured to advance further to some falls, which, at a distance of two days' journey, were said to limit the navigation; but the water was falling rapidly, and, therefore, further progress was impossible. At Bendé the dimensions of the river were: breadth, 295 yards; mean depth, $6\frac{1}{4}$ feet. These, with the velocity of 3 feet per second, give a discharge of 16,600 cubic feet per second. The considerable volume of water brought down by this river renders it probable that its sources lie far away to the north, and hence it is possible that the Fors and Engi, crossed by Lupton Bey in 1882, to the south of the 7th parallel, are parent streams of the Kotto. At lat. 4° 7′ 49″ N. and long. 22° 36′ 2″ E. the explorer found himself at the confluence of two streams of nearly equal magnitude, the Mbomo of Junker, here called the Kengo, and the Makua-Wellé, to which the natives of the district give the name Koyu. The former had a breadth of 765 yards, a depth of $9\frac{1}{2}$ feet, and a velocity of $1\frac{2}{3}$ feet per second, giving a discharge of 36,300 cubic feet; while the latter was 929 yards broad, 6 feet deep, and, with a velocity of 2 feet per second, discharged 36,900 cubic feet per second, the water being very low at the time of measurement.

Returning to Banzyville, Captain van Gèle waited till, in the month of May 1890, the waters had risen to such a height that the steamers could ascend the river with ease. He passed the confluence of the Kotto on the 29th, and was well received by the natives on the Upper Mobangi. Dayo, chief of the Yakoma, his most bitter opponent in 1889, now made a treaty of peace with him. He was also visited by Bangasso, the powerful king of the Sakara, whose residence is situated on the Mbomo. The steamer *En Evant* was able to ascend the Makua-Wellé about as far as the 23rd meridian of E. long., beyond which navigation becomes difficult, and finally impossible, owing to rapids. At the island of Banafia, Captain van Gèle, accompanied by Lieutenant Le Marinel, entered a canoe, and, passing the rapids of Banafia and Bagozo, reached the third and insurmountable barrier of rocks, where the river forms the falls of Mokwango. This point lies in longitude 23° 4′ 27″ E. and is, accordingly, only about 10 miles from Junker's furthest (23° 13′ E. long.). It should be noted that this longitude differs considerably from that formerly given in the *M.G.* (*vid. S.G.M.* vol. iv. p. 332). The latitude, as determined by Lieutenant Le Marinel, was 3° 54′, thus differing from Junker's by 4′ only. On the return journey the Mbomo was ascended, and a visit paid to Bangasso. Both on this river and on its tributary, the Mbili, navigation is stopped a short distance above the confluence by rapids. To reach Bangasso's residence it was necessary to make a journey of four days, partly

by land, and partly in canoes. His town, situated in lat. 4° 49′ N. and 23° 8′ E. long., is of very large extent, and the excellent roads leading to it and the number of warriors which paraded to receive him convinced Captain van Gèle that the power of this chief must be very considerable. A list of points with their positions, as determined by Lieutenant Le Marinel, are given in the article from which this note is taken.

AMERICA.

The Upper Yukon and the Mackenzie.—The *American Meteor. Journal*, vol. vii. No. 7, gives an abstract of the report of Mr. William Ogilvie (who spent the years 1887 and 1888 in exploring this region) to the Canadian Department of the Interior. His survey covers a tract of nearly 2700 miles in a wild country, parts of which had never before been visited by a white man. From Chilkat Inlet Mr. Ogilvie made his way during the summer and autumn of 1887 to the Yukon, and along that river to where it crosses the boundary, where he passed the winter in long. 140° 54′ W., and lat. 64° 41′ N., at an altitude of about 800 feet above Sitka. The mean barometer readings, corrected for temperature, during his stay here were: October, 28·813 inches; November, 28·865; December, 29·058; January, 29·296; and February, 28·943. The high pressure in January is remarkable, for, reduced to sea-level, it becomes 30·3, or 0·3 inch higher than the maximum January isobar on Hann's map. The mean temperatures are not given, but the mean minima were 18·5° in October, −5·1° in November, −33·6° in December, −25·3° in January, and −16·8° in February. Not only is the temperature low, but the country has no agricultural capabilities, for the land along the river is seldom of good quality, and timber is remarkably scarce. From his winter quarters Mr. Ogilvie proceeded by the Tat-on-duc and Porcupine rivers to La Pierre's House, a station on a branch of the latter, and thence by a long portage and the Peel River to Fort M'Pherson on the Mackenzie River. About eleven miles up, a creek flows into the Tat-on-duc, the water of which, according to the Indians, is warm when it issues from the side of a mountain. At any rate, below this point the water of the Tat-on-duc never freezes. Further up the Indians pointed to a high mountain, which they called the Sheep Mountain, and which was estimated by Mr. Ogilvie to rise to a height of 3500 to 4000 feet, and stated that a lake which never froze lay at its foot. On the journey from the Yukon to the Mackenzie the lowest temperature observed was −37°, and the highest was 40°, on April the 30th. The highest temperature in May was 55°, on the 7th. The snow began to show signs of melting on April 30th.

In the lower Mackenzie valley the timber grows as large and strong as on the Upper Lewis, 5 degrees further south. Most of the trees were spruce, but there were also clumps of cottonwood, and willows were found along the streams. From notes made by Mr. Ogilvie it appears that the ice in the Mackenzie, as a rule, breaks up at Fort Norman (lat. about 65°) from about May 12th to the 24th; at Fort Simpson (lat. 61° 52′) about May 3d to the 12th; and at Fort M'Murray (lat. 56° 40′) about April 18th to the 27th. The flats between Fort Simpson and Great Slave Lake would yield a large quantity of good-sized spruce and poplar, and the lower half of Great Slave River is well-timbered with fine spruce. Between the Athabasca Lake and the Arctic Ocean, a distance of 940 miles, the land for over 30 miles on either side the river is, as far as quality of soil is concerned, as capable of supporting an agricultural population as the provinces of Ontario and Quebec; and at Fort M'Pherson, where the mean minimum reading of the thermometer during the last ten days of June was 37·3° F., Mr. Ogilvie believes that most cereals and vegetables could be cultivated successfully. This station enjoys many

hours of sunlight during the summer months, which gives it an advantage over some of the stations more to the south. At other forts, however, garden produce and barley yield good crops, and at Fort Providence wheat has been grown for many years by the Hudson Bay Company. In conclusion, Mr. Ogilvie gives his opinion that, though this country is not attractive to settlers, its condition is more favourable than might have been expected, and that, when land becomes scarce elsewhere, the Mackenzie valley may prove of some value.

The Mississippi.—A pamphlet by Mr. Alex. D. Anderson on the Mississippi and its forty-four tributaries has been printed by order of the U.S. Senate. The drainage-system of the river extends from Canada to the Gulf of Mexico, and from the Rocky Mountains to the Alleghanies, and the commercial importance of the states it embraces may be judged from the fact that, according to the census of 1880, they furnish 94 per cent. of the coal produced in the United States, 81 per cent. of the pig-iron, 89 per cent. of the maize, 74 per cent. of the wheat, 98 per cent. of the sugar, besides very large proportions of other agricultural products. The alluvial lands of the Lower Mississippi cover an area of 41,193 square miles, of which 90 per cent. are capable of cultivation, though only two million acres are actually tilled, owing to the dread of the periodical inundations. In 1879 the Mississippi River Commission was appointed to consider plans for the prevention of these floods, for the improvement of navigation, and for the promotion of commerce and trade. The Mississippi is the natural outlet for the trade with Central America, Mexico, and the West Indies, countries which now take only 15 per cent. of their foreign imports from the States, and of this small quantity only one sixtieth in value is shipped from New Orleans. The completion of the works now in progress will, Mr. Anderson believes, give a great impetus to the commerce of this city.—*Bulletin of the American Geographical Society*, vol. xxii. No. 3.

Meteorological Observations in Mexico.—The following figures are taken from the *Annuario del Observatorio Astronomico Nacional de Tacubaya* for the year 1891. This observatory is situated in about 19° 24′ 17″ N. lat. and 99° 11′ 30″ W. long., at an elevation of 7618 feet. The mean height of the barometer for the months December 1888 to November 1889 was 23 inches (reduced to freezing point), the highest monthly mean being that of November, 23·03, and the lowest, that of March, 22·94. The mean shade temperature was 60° for the year, the highest occurring in June, 66°, and the lowest in December, 54°. During the twelve months 28 inches of rain fell on 99 days, none falling during the months of December, January, and February, while the wettest month was August, with a fall of nearly 7 inches on 23 days.

AUSTRALIA.

West-Central Australia.—Mr. W. H. Tietkins was sent out in 1889 by the Central Australian Exploring and Prospecting Association to examine the country in the west of the colony of South Australia. Leaving the Alice Springs Telegraph Station on March 14, he travelled along the north side of the Macdonnell Ranges to Glen Helen Station, about ninety miles westward. The Macdonnell Ranges form the southern boundary of the Burt Plain, which is well covered with grass and timbered near the mountains with *Mulga* and *Grevillea*. The bean-tree also grows here, and yields an excellent light, tough wood. Glen Helen Station stands about three miles south of Mount Razorback, and about six miles west of Mount Sonder. Mr. Tietkins ascended both these mountains, and found that the former rises 1831 and the latter 2495 feet above Glen Helen Station. In a romantic glen at the foot of Mount Sonder flows the Redbank Creek, one of the sources of the

Finke River. The next encampment was at Glen Edith, a spot visited by Giles in 1873. The route then ran over sandhills covered with *spinifex*, across a range of mountains, named by the explorer the Watson Range, to a lake situated in the territory of West Australia. This lake Mr. Tietkins named after Mr. A. C. Macdonald, the honorary secretary of the Victorian Branch of the Royal Geographical Society of Australasia. The position of its western shore he found to be 128° 15′ E. lat., and 23° 30′ S. long., approximately ; and from the top of the Bonython range, on the southern side, he judged that it extended about 15 miles from east to west, and 12 miles from north to south. Several small ranges lie to the northwards, while to the west the same *spinifex*-clothed sandhills stretch away to the horizon. Mr. Tietkins now turned towards the south-east, and, after visiting Blood's Range, and giving names to one or two small chains in that neighbourhood, arrived at Mount Unapproachable, the western extremity of Long's Range, and found that Lake Amadeus terminates here instead of stretching out far to the west as represented in the present maps. It is a long, narrow channel, and receives no streams of any importance. Mr. Tietkins made his way home by Mount Olga and Ayer's Rock, 2800 and 2200 feet high respectively, and through a fine grazing country to the Erldunda Station. Having been favoured with a splendid season, he was able to map an area of 14,000 square miles of country, some of which is available for pastoral purposes.—*Trans. of the Roy. Geog. Soc. of Australasia (Victorian Br.)*, Part 1., vol. viii.

GENERAL.

The Mean Coast-Distances of Continents.—The proximity of countries to the sea has a most important bearing on their climate, commercial development, etc., and therefore the problem of ascertaining the relative advantages in this respect of different parts of the world has long attracted the attention of geographers. In *Petermann's Mitt.*, Bd. 36, Nos. 3 and 4, Dr. Carl E. M. Rohrbach explains a new method of solving the problem, in which the mean distances of the continental lands from the coast play an important part. As a preliminary investigation he shows that the mean distance of a circle from the circumference is one-third of the radius, and that this distance is the same for a square, or other rectilinear figure, circumscribing the circle. It is found by integrating the product of an elementary area into its distance from the perimeter and dividing by the whole area. The process is, therefore, similar to that of finding the centre of gravity of the area, and, accordingly, the value may be very simply found by dividing the circle or square into indefinitely small triangles by radii drawn from the centre, the centres of gravity of which are, of course, at one-third of the radius from the perimeter. From this result Dr. Rohrbach deduces the mean distance for a rectangle, and shows how to find it for a *calotte*, or the spherical area contained by a small circle of a sphere. Even for a large *calotte* it differs very little from that of a circle of equal area. These investigations prove that of all figures containing the same area the circle and its circumscribed figures are those in which the distances from the perimeter are greatest, and this proposition is exhibited in a convenient form by means of curves, in which the abscissæ are proportional to the areas, and the ordinates to the distances from the perimeter. In the diagram thus constructed the curve (a parabola of course) for the circle lies outside all the others, and as the area deviates more and more from the circular form, its curve approximates more closely to a straight line. Owing to this property the circle gives a convenient standard for mean distance from the coast, as will be seen presently.

In dealing with continental areas Dr. Rohrbach draws contour-lines on a map parallel to the coast-line at certain chosen intervals, and measures the areas contained with a planimeter. If great accuracy be desired, the lines must be traced on a map in which there is no distortion, and then transferred for measurement to an equal-area map, but in a first assay, to demonstrate the applicability of the method and the value of its results, Dr. Rohrbach considered Bonne's projection sufficiently accurate for tracing the lines as well as for measurement. A map of the world and another of Europe are appended to the article, on which the contour lines are drawn, and the coast-distance of the areas between them denoted by different colours. The relative conditions of the continents are also shown, both by rectangles of which the bases are proportional to the areas, and the altitudes to the mean coast-distances, and also by curves—*chorigraphic*, as Dr. Rohrbach calls them—where the ordinates represent the coast-distances corresponding to the areas indicated by the abscissæ. Tables are given showing the areas lying beyond different distances from the coast in the various continents, both in square kilomètres and in percentages. The following shows the mean coast-distances :—

Europe, 208 miles.	Australia, 214 miles.
Asia, 482 miles.	North America, 292 miles.
Eurasia, 433 miles.	South America, 343 miles.
Africa, 417 miles.	The five Continents, 381 miles.

As a measure of the accessibility of continents from the coast, Dr. Rohrbach proposes the quotient obtained by dividing the mean distance in a circle, or in a *calotte*, of equal area by the actual mean distance, and gives the numbers in the latter case, but the result is scarcely satisfactory. As he himself points out, Eurasia appears to greater advantage than Europe, because the mean distance in the *calotte* is calculated as though sea instead of land lay to the east, and thus the quotient is increased. It is also startling to find North America represented by a higher figure than Europe, and the five continents by a number more than twice as great. It is easy to see that these discrepancies arise because the numbers represent only the advantage each continent derives from its actual shape compared with its accessibility if formed into a *calotte*, and do not indicate the relative accessibility of the continents. A more correct idea is obtained by taking the mean coast-distance (1416 miles) in a *calotte* of area equal to that of the five continents, or the actual mean distance (381 miles), as unity. In the latter case the numbers are as follows :—

Europe, . .	1·83	Australia, . . .	1·78
Asia, . .	0·79	North America, . .	1·30
Eurasia, . .	0·88	South America, . .	1·11
Africa, . .	0·91	The five Continents, .	1·00

Dr. Rohrbach claims that his method is superior to those before employed, because the mean coast distance is a quantity admitting of simple definition, and not deduced by any artificial means from the geometrical forms. Its value also is easily reckoned, and can be worked out to any desired degree of accuracy, maps of various scales being employed according to the extent and configuration of the countries under examination. In almost all other methods the length of the coast-line has been used, the estimation of which leaves much room for speculation, causing great uncertainty in the results. In the present method this quantity is not needed, and yet the meanderings of the coast-line exercise their due influence on the curvature of the contour lines, as may be clearly seen on the map of Europe already alluded to. And not only is the method applicable to purely morphological

investigations, but charts may also be constructed, showing the relative conditions of the various parts of a country with regard to means of communication. Thus, an ice-bound coast may be treated as an inland boundary, and, where a chain of mountains intervenes, the contour-lines may be drawn so that their normals run to the sea past the extremities of the chain, or converge to the passes. Navigable rivers, railways, etc., may also be taken into account, and also the elevation, etc., charts being constructed to show the work required to transport a unit weight of goods, say a hundredweight, from the coast. Each contour-line in such charts will pass through all places to which the labour of transport is the same, and will therefore resemble an isobar or isotherm.

Tidal Prediction.—Professor G. H. Darwin, in the Bakerian Lecture delivered on January 29th, showed how tables may be drawn up from which the tides at a port may be rapidly computed for any day. The information supplied by the Admiralty is very rough, and makes no allowance for the diurnal tide due to the moon's declination, and there is no arithmetical method of computation employed which does not involve much labour and expense. The variation in the height of the water depends principally on the mean longitudes of the moon and sun, and, in a less degree, on the longitudes of the lunar perigee and node. Professor Darwin's tables, then, give the intervals after the moon's transit and the heights of high and low water, with corrections depending on the longitude of the moon's node and her parallax, calculated for every twenty minutes of the moon's transit and for about every ten days in the year. To test the accuracy of these tables the port of Aden was chosen, its tides being very complex and apparently irregular, and the results worked out by Mr. J. W. F. Allnutt were compared with the predictions of the Indian Government, or with the data given by actual observation. In the latter case the probable error was seven minutes in time and 1·4 inches in the height of the water.—*Nature*, Feb. 5th, 1891.

Dr. Nansen's Arctic Expedition.—As misconception prevails and erroneous statements are being circulated with reference to Dr. Nansen's proposed Arctic expedition, it may be advisable to give the facts as to what has been done and arranged up to date. This we are able to do at first hand. Dr. Nansen's desire is to leave Norway in February 1892, but it is doubtful whether the special vessel which is being built will be ready by that time. Outside of Norway no money has been contributed. The expedition is purely Norwegian, and will remain so. The Norwegian Government contributes 200,000 kroner; King Oscar, 20,000; twelve private individuals (all Norwegians, except one Englishman, who has lived in Christiania for many years), 90,000: in all, 310,000 kroner, equal to £17,210. This sum, Dr. Nansen believes, will be sufficient. The ship, of course, is being specially constructed for the peculiar conditions that exist between the New Siberian Islands and the Pole. Dr. Nansen will be accompanied by probably not more than eight young men, all as stalwart and strong in physique as himself, and all equally confident of success. It may be of interest to state that Messrs. Longmans and Co. will shortly publish a work on the New Siberian Islands, the real starting-point of the expedition, by Baron von Toll, who, as a member of a recent Russian expedition, spent a considerable time in their exploration.—*Times*, 6th March.

COMMERCIAL GEOGRAPHY.

Proposed New Railways in Scotland.—At a recent meeting of the Glasgow Philosophical Society Mr. John Struthers submitted a paper dealing with a proposed new railway in Scotland. Beginning with the suggestion that the Glasgow and

South-Western Railway—negotiations for amalgamation with the North British Railway being now broken off—ought to join the Highland and Great North of Scotland Companies, he proceeded to show how this could best be done by the construction of but comparatively short lengths of new lines. The new railway would leave the Glasgow and Paisley joint line at a point between Hillington and Arkleston, cross the level strath traversed by the river Cart, and ascend by an easy gradient to a spot behind Erskine House, where the highest level in this portion of the line would be attained. It would then cross the Clyde by means of a high-level bridge, and, proceeding through the Vale of Leven, would skirt the west side of Loch Lomond, where it would join the West Highland Railway, nearly 40 miles of which could be utilised, bringing the line to within a few miles of Loch Ericht. Leaving the West Highland system it would skirt the loch, and join the main line of the Highland Railway at Dalwhinnie, from which two branches would diverge, one running east and joining the Great North of Scotland system in Deeside, the other striking west and having its terminus at "The Narrows," opposite Skye. Should this proposal be carried out, it would result in binding together three isolated systems, and represent a capital of £24,000,000, with a mileage of 1100 miles.

It is also proposed to construct a short line from a point between Georgemas Junction and Thurso to Gills Bay on the Pentland Firth. A new harbour is projected at Gills Bay, which the mail and passenger boats from Orkney could reach in a shorter time and with much more convenience than their present landing-place in Scrabster Roads. An alternative proposal makes Wick the departure point of this line.

The Great North of Scotland Company have been approached with a view to the construction of a new line joining Wick and Helmsdale (both stations on the Highland Railway) and proceeding along the coast by Dunbeath and Lybster.

Custom Duties in the Congo State.—At the Conference held in Brussels, in November and December of last year, it was decided, on the proposal of France, that the Powers holding territory in the basin of the Congo, viz., France, Portugal, and the Congo State, should make an agreement among themselves with respect to the duties to be levied. The modifications resulting from this agreement have been promulgated in the *Bulletin Officiel* of February, and will come into force on September 1st at the latest. Patent rights on ivory are suppressed : an export duty of 10 per cent. *ad valorem* is to be levied on ivory bought below Stanley Pool and in the region of the Upper Congo and its tributaries as far as they are navigable, within a distance of 50 kilomètres (31 miles) from these rivers ; and a duty of 25 per cent. on ivory bought in any other part of the State. The value is assessed as follow ;—For pieces of ivory, teeth, etc., 10 francs per kilo. ; for tusks weighing less than 6 kilos., 16 francs per kilo ; and for tusks over that weight, 21 francs per kilo. This assessment will be periodically revised in accordance with the state of the market. These duties are instituted for a period of ten years, and during the same time caoutchouc will be subject to an export duty of 10 per cent. *ad valorem.* On the other hand, personal and direct taxes will be reduced to one-third for the first five years and to one-half for the remaining five. According to the *Revue Française* an import duty of 10 per cent. will be levied on fire-arms, powder and munitions of war, and salt, and of 6 per cent. on all other goods. Material for railways will be for the present exempt, and travellers' and missionaries' luggage, instruments, etc., will be admitted free.

The Commerce of Japan.—The foreign commerce of this country amounted in 1889

to £22,694,079, of which £11,676,784 represents the exports, and £11,017,295, the imports. Compared with the preceding year these figures show an increase in the total commerce of over £833,000. The custom-house returns show also an excess of importation of specie and bullion over exportation amounting to £1,497,453. Yokohama has far the largest share in the commerce, and Kôbé takes the second place, the value of the goods passing through these ports being nine-tenths of the total. Great Britain and her colonies have by far the largest share in the foreign trade, the value being £9,249,755. The United States follow with £5,237,674, and then, far behind, France and China. A comparison with the figures of 1888 shows that Great Britain has lost trade to the value of £500,000, while the United States have gained an equal amount. It is proposed to construct a jetty at Yokohama, and to improve the harbours of Tokio and Nagasaki.—*Bull. Consulaire Français*, August 1890.

The Siberian Railway.—*The Boll. della Soc. Geog. Italiana* has learnt from Russian sources that this railway, so often mentioned in these pages, is actually to be commenced in the spring. A technical commission, appointed to determine the route, and to decide whether the line should be continuous, or only connect the navigable rivers, has given its decision in favour of a continuous line, running from Ufa through Slatoust, Omsk, Krasnoiarsk, Nijni Udinsk, and Irkutsk, to the Amur, which river and its tributary, the Ussuri, it will follow, and thus reach Grafskaia and Vladivostok. Its total length will be about 4900 miles, and its cost about 54½ million pounds sterling. Of the three sections into which the line may be divided, the first, from Slatoust to Tomsk, will cross a flat country comparatively well peopled, and, with the assistance of a branch to the region of the Altai and an augmentation of the traffic along the Ob and the Irtish, may soon pay its working expenses. The second section, from Tomsk to Irkutsk, does not promise such immediate advantages, but it traverses the auriferous region of Siberia. The last section, running through a thinly populated country with an inhospitable climate, will demand a large outlay, both for construction and working, and will be a constant source of expense for a long time to come. The stations will be about 31 miles apart, and communication across the broader rivers will be effected by means of steamboats. *The Times*, February 14th, states that the Samara-Ufa line is already extended to Slatoust, and will be continued to the gold-mining town of Miask on the eastern side of the Urals, so that only 4785 miles of railway have to be constructed. It also gives the more moderate sum of £36,765,000 as the cost of the undertaking, which, by the use of pontoons and steam ferries in lieu of permanent bridges, may be reduced to about 35 millions.

The Kashmir Railway.—The establishment of railway communication between Kashmir and India is of the greatest importance from strategical and commercial points of view. It is essential for the defence of India that rapid means of transport should exist to a part of the empire from which easy passes lead across the frontier. Again, the abundant crops of Kashmir can be carried down to the Punjab by rail at half the present cost, while, when famine visits this usually productive valley, as it did in the years 1877 and 1878, carrying off two-fifths or more of the inhabitants, it will be possible to render assistance to the sufferers. To tourists and residents in India cheap means of access to a lovely valley and an invigorating climate will be a great boon. Four routes into Kashmir, known respectively as the Banihál, the Punch, the Punjar, and the Abbottabad, have been carefully surveyed by Major-General de Bourdel, and of these the Punjar has been selected for the line as possessing the greatest combined advantages with respect to facility of construction and strategical considerations. Leaving the

North-Western Railway near Rawal Pindi, this route runs through Punjar, Kohala, and Baramula, to Srinagar, a distance of 210 miles, of which 78 miles are within British territory. The cost of construction is estimated at two and a quarter to two and a half millions sterling, and will be borrowed under guarantees from the India and Kashmir Governments.—*The Times*, February 12th, 1891.

The New Mail Route to China and Australia.—Sir G. Baden-Powell read an address on this subject before the London Chamber of Commerce (*Journal*, February 10th, 1891). It is proposed that the new line of steamers shall run from some port in the south of England, and that at Halifax connection shall be made with steamers to the West Indies, thus bringing Jamaica within eleven days' sail from Plymouth. In the transit from England to Chicago or St. Paul twenty-six or thirty hours will be saved as compared with the New York route. The main feature of the new route is, however, the through-traffic across the Pacific. The distances to be run are :—3000 miles across the Atlantic ; 3500 across Canada ; and then 4500 to Japan, or 6500 to Australia. Thus, more than a quarter of the whole distance to Australia can be traversed by express trains, and the ocean distances are not too great for a high speed in steamers. As the Atlantic can be crossed in five days, and Canada, by train, in the same time, a traveller will find himself starting on his voyage across the Pacific ten days after leaving England. The steamers run alongside the railway jetties at Halifax and Vancouver, and no delay is caused by coaling or transferring cargo. The mail contract provides that mail matter shall be carried once a month from Halifax to Hongkong within 684 hours in summer, and 732 in winter. In view of the increasing trade between Canada and countries lying beyond the Pacific, as well as of the large trade across the Atlantic, almost equalling in value that with the other countries of America, the establishment of this new line of communication must be looked upon as a most important event. It will also form a new link with our American colony, and provide an alternative route to the Australian colonies, should a war break out, and the Suez Canal be closed to British vessels. Even if the latter route should be open, merchantmen would run less risk from the enemy in crossing the open ocean, and no danger from rocky shores. Early this spring three splendid steamers will be on the Pacific, carrying the Chinese and Japanese mails, and though the Atlantic and Australian steamers have not yet been provided for, it is well known that responsible financial houses in London are ready to take up the scheme. The Canadian Government has made the handsome offer of a subsidy of £150,000 a year, and other countries will, no doubt, furnish assistance.

MISCELLANEOUS.

Mr. Frank Beddard, F.R.S.E., Prosector in the Zoological Gardens, London, has an excellent paper in Part II. vol. x. of the *Proceedings* of the Royal Physical Society on the **Geographical Distribution of Earthworms**. The paper is illustrated by two maps.

The area surveyed in **Burma** during the past year was, according to the *Administration Report*, 31,680 square miles, including nearly 9620 miles on the Siamese frontier. 550 square miles were surveyed in Kyaukse by a cadastral party, and 81,000 acres of State lands in Upper Burma by local surveyors.

M. Th. Tchernysheff, a geologist, accompanied by Professor Backlund, a mining engineer, and a botanist, has explored the *tundras* of **North-East Russia**, collecting valuable geological and orographical data and mapping-out about 25,000 square miles of an almost unknown region.—*Nature*, February 26, 1891.

Dr. Buchan has studied the **Variations of the Winds on Ben Nevis** with particular attention, and the results he has obtained, which are published in the *Transactions of the Royal Society of Edinburgh*, vol. xxxiv., constitute a complete account of the movements of the air on that mountain and, in particular, of the effect of wind-pressure on the barometer.

The Central Committee has forwarded an invitation to the ninth **Geographical Congress**, to be held in Vienna on the 1st, 2d, and 3d of April 1891. The chief subjects of discussion will be the Present State of Geographical Knowledge of the Balkan Peninsula and the Investigation of Inland Lakes. Geographical Instruction will also receive attention. A Geographical Exhibition in connection with the Congress is announced.

Mr. Henniker Heaton has received a telegram from Australia announcing the returns for the mail under the new **Cheap Ocean Postage** regulations. From Melbourne 18,791 letters were despatched, as against 8920 by the former mail. The other Australian colonies also show an increase in the number of letters sent varying from 20 to 50 per cent. The Postmaster-General reports that the increase in the outgoing mail has been very marked.

Instead of the route to the **Mékong** from Moulmein to Luang Prabang, English promoters now propose to construct a **Railway from Bangkok** through Korat to Lakong on the upper and navigable course of the Mékong. The *Revue Française* (March 1st, 1891) considers it the most practical way of solving the difficulties connected with the navigation of this river, and suggests that the French should make a line from Touron to Kwang-tri and thence to Pnom, the lowest point at which the river is navigable.

Much interesting and instructive information is contained in Monsieur J. Thoulet's **L'Étude des Lacs en Suisse**. The author treats of the configuration of their basins, the laws relating to *seiches*, the chemical ingredients of their waters, etc., and describes the instruments and methods employed by the Swiss hydrographers in their observations. The living inhabitants of the lakes are also discussed, both fish and the small organisms which affect the salubrity of the water. In short, the pamphlet is a record of scientific knowledge relating to the lakes as they now exist.

This year a school for the practical **Training of Travellers** is to be opened at Genoa in connection with the Royal University of that town. The students who attend it will receive instruction in geography, geology, botany, geodesy, and other subjects, a knowledge of which will enable them to make scientific observations and form collections of natural objects in distant lands. Admission to the school will be granted to those provided with a certificate from a technical or nautical lyceum, on payment of an annual fee of 20 lire (16s.).—*Bull. della Soc. Fiorentina della Soc. Afr. d' Italia.*

The German Government have chosen **Dar-es-Salaam** for the capital of its possessions in East Africa. It is situated on the coast nearly on the latitude of the southern point of the island of Zanzibar, and is one of the few thoroughly sheltered ports between Cape Guardafui and Delagoa Bay. The water is deep enough to allow warships to enter safely, and a few rocks, which now somewhat obstruct the approach, may be removed by dynamite. According to the *Mouvement Géographique*, it requires little to make it an excellent port and the *entrepôt* for the commerce of this part of Africa.

Recent **Excavations at Luxor** have had highly interesting results. Three galleries were discovered and cleared at the bottom of a shaft 48 feet in depth. One of the galleries was empty, but the others contained 152 mummies, all intact, 149 of which belonged to the twentieth dynasty and 2 to the nineteenth dynasty. There were also discovered 110 cases containing statuettes and votive offerings, 77 papyri, and statues of Isis, Nepthis, and Osiris, as well as other valuable and highly interesting remains. M. Grebaut catalogued the whole collection, after which it was safely transferred to barges for transport to Cairo.

The Fifth Session of the **International Congress of Geologists** will be held at Washington, U.S.A., on August 26. The Committee of Organisation will endeavour to obtain from the steamship companies a reduction of rates in favour of foreign members, and will make arrangements for a series of geological excursions. They request, therefore, that those who intend to be present at the Congress will communicate with them as early as possible. The annual meeting of the American Association for the Advancement of Science and the Summer Meeting of the Geological Society of America will be held in Washington the week before the Congress.

A Committee for the investigation of questions relating to **Emigration and Immigration** has just been formed at Paris under the presidency of M. Levasseur. Its object is to devise a scheme of international law for the protection of emigrants who settle in colonies not belonging to the country of their origin, and, if possible, to call together a diplomatic conference, at which the various States should elaborate a common code of regulations. The committee will confine itself exclusively to scientific and philanthropic objects, and will abstain from all attempts to direct the flow of emigration to or from any particular country and from any interference with settlers in a colony of their mother-country.—*Revue Française*, March 1st, 1891.

The Administration Report of Bombay states that, during the year 1889-90, 1585 sq. miles of country were topographically surveyed by the Gujarat party, and that the Mahratta party surveyed topographically 1372 sq. m., triangulated 1200, and traversed 1540. Of the whole cultivable area of the Presidency, amounting to 25,900,000 acres, nearly 24,500,000 are now under cultivation, 138,534 acres having been taken up during the year. The trade of the port of Bombay continued to expand, though not so markedly as in the previous year. The value of the foreign trade was about £58,930,000, and the increase nearly $5\frac{1}{2}$ per cent. of the value for the preceding year. The total length of railways open to traffic was extended from 5125 to 5366 miles, and 305 miles were added to the telegraph lines, making a total of 4917 miles.

Our Hon. Corresponding Member, Monsieur de Margerie, has sent us two pamphlets, the one on the structures of the **Corbières**, the other on the **Geology of Andalusia** and the earthquake of December 25, 1884. Their contents are chiefly interesting to geologists. It may, however, be mentioned that M. de Margerie finds in the Lower Pyrenees evidence of the existence, in the Oligocene period, of a connection with the highlands of Provence and the Alps across the area now occupied by the Gulf of Lyons. The *Géologie de l'Andalusie* is a *résumé* of the report of the French mission under M. Fouqué. The epicentre of the earthquake was in the neighbourhood of the fault lying between the Sierra Nevada and the Sierra Tejeda. M. Fouqué estimated the velocity of propagation of the shocks at 5200 feet per second, and the depth of the centre of disturbance at nearly 7 miles, but admits that the data were too scanty and the methods too untrustworthy to give reliable results.

NEW BOOKS.

Reisen in Kleinasien and Nordsyrien. Von Karl Humann and Otto Puchstein. One vol. 8vo text, pp. 424, with 49 Illustrations, and an Atlas in folio with 3 Maps, by H. Kiepert, and 53 Plates. Berlin : D. Reimer, 1890.

In this book we have an account (1) by Dr. K. Humann of the expedition organised in 1882 by the Berlin Government for the purpose of making a cast of the great inscription which was engraved on the walls of a temple dedicated in the Galatian capital to the worship of Rome and Augustus ; (2) by Dr. Puchstein of the expedition in 1882 to investigate the reported discovery of a wonderful monument on the top of a mountain near the Euphrates in Commagene ; (3) by Dr. Humann of the expedition made in 1883 to examine the monument more accurately and completely ; (4) by Dr. Puchstein of this monument, and of others discovered in the course of the expedition.

The first thought that must occur to every mind is of admiration for the enterprise and many-sided interest shown by the German administration. It is impossible in view of expeditions like these for any educated mind to grudge Germany its present lofty position in the councils of Europe. That position is not won merely by "blood and iron," but by liberal arts ; and it is supported by constant expenditure of money and brains, not merely on a vast army but on magnificent projects in literature and science. The review of his own achievements, made by the Emperor Augustus towards the close of his long life, has been known for centuries to be engraved on the *antæ* of the temple at Angora ; but the imperfect copies by Tournefort, Macdonald Kinneir, Texier, and Hamilton were only sufficient to show that it was the most important historical inscription in existence. A vain attempt by Dr. Mordtmann in 1859, at the expense and under the direction of the Berlin Academy, and a partially successful attempt by M. Perrot in 1861, at the expense of Napoleon III., might have satisfied the wishes or cooled the enterprise of most nations, but only nerved the German Mommsen to have the thing done thoroughly as soon as the proper man could be found. The excavation of Pergamos revealed the man, and in 1880 the expedition to Angora was resolved on. Two German expeditions and a French one to copy a single inscription may seem to British taste a disproportionate expenditure, but the fact remains that two nations much poorer in purse than ours did not grudge the outlay.

We quote Professor Mommsen's brief description of the two German expeditions (*Hermes* 22, p. 302) to prove the accuracy of our statement. "The Academy charged in 1859 the late Dr. Mordtmann with the revision both of the 'Charter of of Orcistus' and of the Augustan memorial at Ancyra. But this expedition proved in all respects a failure. The work at Ancyra left everything of importance to be done by later travellers, and the stone at Orcistus was not even found. . . . One has not in old age the fulfilment of everything that one hopes for in youth ; but in this case the proverb has proved true for me. Our debt to Humann at Ancyra is known to all ; and the unsuccessful attempt of our countryman at Orcistus has been carried out with brilliant result by the skill and energy of my friend Professor Ramsay, now in Aberdeen."

The history of the two Commagenian expeditions is almost equally remarkable. The first was made to investigate the truth of a report as to the existence, the second to measure, survey, and describe completely the remains, of the wonderful monument on the summit of the Nemrud Dagh. Unfortunately, in spite of its great size and wonderful character, neither can its artistic value compare for a moment with Humann's discoveries at Pergamos nor its historical importance with

that of the Angora inscription. The monument commemorates an insignificant king of Commagene (North Syria), named Antiochus, who reigned 69-34 B.C. It takes the form of a tumulus about 500 feet in diameter and 170 feet in height, perched on the peak of the Nemrud Dagh, over 7000 feet above sea-level. On the east and the west sides of the tumulus are rows of colossal statues, representing Helios, Commagene, Zeus, Antiochus himself, and Heracles. The style of art is Greek, slightly orientalised ; the historical value of the long inscription is exceedingly slight ; and the monument, in spite of its gigantic size and curious character, is rather one of the disappointments of archæology. The work of examining it, however, had to be done, and could not have been done better.

Such were the chief objects of the expeditions described ; but we need hardly say that by the way many other objects were accomplished. The geographical results attained by such a practised surveyor as Dr. Humann were great, and have enabled Professor Kiepert to produce a map of Commagene in such detail as was previously unexampled in any part of Western Asia except perhaps Palestine after the survey of the Exploration Fund. It is impossible even to enumerate the chief results of various kinds in this brief notice. The remarkable sculptures of Sindjirli, which Sir Charles Wilson discovered, and laboured in vain to persuade the British Museum to carry away, did not escape Humann, and now adorn the Berlin Museum.

The style of this publication rouses mingled reflections. Humann's share is described in popular style, in a bright, sparkling, and effective manner, which carries on it the stamp of his own strong individuality. Work of this kind would readily find a publisher, and would command a large sale in England. Puchstein's account of his first expedition consists merely of his road-book, and it appears rather a waste of money to print in such luxurious form such undigested work. His account of the late monuments in Commagene is detailed and derives interest from the extraordinary character and colossal size of the sculptures ; but the subject is not one on which the writer could summon up any enthusiasm. His account of the older art, which he, like some English writers, styles "Hittite," is brief, superficial, and disappointing ; while the copies of some of the hieroglyphic inscriptions seem hardly to be entirely trustworthy. The maps and illustrations are excellently produced, with a disregard for expense which contrasts strangely with the poor style in which most work of the kind is done in England, or, still more, with the frequent impossibility of getting it done at all.

A Ride through Asia Minor and Armenia: giving a Sketch of the Characters, Manners, and Customs of both the Mussulman and Christian Inhabitants. By HENRY C. BARKLEY. Pp. x + 350. London : Murray. *Price* 10*s.* 6*d.*

This is a pleasant volume of travels ; that is to say, the usual incidents of the journey are set forth in an intelligent, lively, and agreeable style ; the scenery as well as the general character of the country is well described, as are its natural resources, so far as these can be grasped by the passing traveller. For all else—as the action of the Government, the condition of the people, the relations of the different races to each other—the value of the book is considerably impaired by the fact that the journey described took place fourteen years ago, and at a time of more than ordinary social and political dislocation, viz., just after the last Russo-Turkish war. It is interesting, no doubt, to know how matters impressed the traveller in 1877 ; but the reader would have liked to be informed how far the condition of matters described has since been improved or modified.

The writer was greatly struck by the amount of cultivable land lying waste.

Population, he says, is what is most wanted. Even if all the Turks in Europe were to cross into Asia it would not, he says, make much difference, as tenfold the present numbers could be supported. But though there is much available land on the route he followed, viz., from Brusa to Angora and Kaisarieh, and again in the great plain of Adana between Taurus and the sea, there is also in the Central provinces much that is barren and desert. The Adana region, watered by the rivers Sarus and Pyramus, might, he says, with good government, energy on the part of the people, and absence of fever, be made by irrigation a second Lombardy. The people, however—irrationally, as he thinks—object to irrigation as increasing fever; but Indian experience rather bears out their objection. Mr. Barkley points out that the great fever region is exactly opposite Cyprus, and speculates as to whether the malaria is carried thither across the sea.

Passing through the Cilician Gates into the plains beyond, the travellers, in the month of November, entered on another summer. Their route thence lay by Aintab and the Euphrates to Diarbekir, and thence to Trebizond, the entire route from Cilicia to the mountains above Trebizond passing through a region recklessly denuded of trees, causing a serious deterioration of climate as well as great economic loss. Between Diarbekir and Trebizond they were racing against winter, and towards the end of December narrowly escaped being snowed up in the mountains.

The writer speaks very unfavourably of both Turks and Armenians; he found both, however, uniformly hospitable, and, though the country was full of disbanded and starving soldiers returning from the war, he met with no opposition or violence. All parties, both "honest men and rogues," were longing, he says, for annexation to England!

The spelling of certain foreign words and names might have been corrected with advantage; and the "two chapters" by Mr. Henry Elwes on botany and ornithology, referred to at p. 177 as being at the end of the volume, but which are not to be found there, would undoubtedly have been welcome.

A Modern Apostle: Alexander N. Somerville, D.D. By George Smith, C.I.E., LL.D. With Portrait, Map, and Illustrations. London: John Murray, 1890. Pp. ix + 423.

The subject of this memoir may well be designated "A Modern Apostle," for, as St. Paul preached in all the world of the ancients, so he preached in most parts of the globe. He made missionary tours through the chief European countries, crossed over to America twice, and visited South Africa, India, and Australia. At home also he laboured hard in the mission field, conducting revival meetings and sending cheap Bibles into the Highlands; while, as Home Secretary for Foreign Missions, he became, in 1840, the Scottish founder of the Lovedale Institution, where natives of South Africa are trained as catechists and teachers, and prepared to spread civilisation and Christianity among their fellow-countrymen. When we remember that Dr. Somerville also fulfilled for many years the duties of minister of Anderston Free Church, in connection with which he established several institutions for the spiritual improvement of the people, we cannot help being struck with the vast energy he displayed during his ministerial career of more than fifty years. As might be expected from an author of such experience in biographical literature, the work is written in an agreeable style, and the material has been, on the whole, judiciously selected. It is not overloaded with letters narrating trifling domestic incidents, but those that are inserted, with few exceptions, contain information of general interest, or serve to place in a clearer light the character of the

man, his opinions, or his kindly nature. Nevertheless, on looking at this volume of over 400 pages, we are reminded of Dr. Somerville's exclamation at a meeting of the presbytery, when a minister produced a bulky manuscript from which to read his speech—"O Moderator, life is short." Some less important events might, perhaps, have been passed over, a few of the extracts from sermons omitted, and short abstracts given of one or two letters that have been published in full. Many readers, however, will probably not indorse this opinion, especially those who take a lively interest in missions. To such, and to all who take pleasure in following the course of a noble life, the latest of Dr. Smith's biographies of eminent missionaries will be a great acquisition.

Marocco and the Moors. By Arthur Leared, M.D. Second Edition. Illustrated. London: Sampson Low and Co., 1891. Pp. 354.

Though fifteen years have elapsed since the late Dr. Leared published his work, and many valuable volumes on Morocco have been written by English, French, and German travellers, it cannot be said that *Marocco and the Moors* is out of date.

Despotism and fanaticism have paralysed the slight progress of which Morocco is capable, but European influence has secured greater immunity from danger than that which European travellers enjoyed at the time when Dr. Leared visited Morocco city. Consequently, whilst much of Dr. Leared's information no longer can be regarded as information, it is as true to-day as it was when it was written. He visited the chief maritime ports, and penetrated as far as the capital of Morocco, but his arrival at the city was ill-timed, owing to internal trouble, and he nearly paid for his enterprise with his life.

A peculiar interest attaches to the second edition of this work from the fact that it is introduced with a preface by the late Sir Richard Burton, dated from Trieste on 1st October 1890—or about three weeks before his death. The following paragraph in this preface is worth quoting:—"The time is coming when France and Spain, the Powers most interested in the matter, will, by perpetual pressure, get the better of some soft-headed 'Caliph of our Lord Mohammed enthroned by Allah his will'; and the steam-whistle on the Tangier-Fez railroad shall destroy not only 'feudalism,' but fanaticism and privacy, lethargy and independence. Nor will the European occupant, after the danger and damage of defeating a nation of *fous furieux*, of fanatics brave to desperation, find great difficulty of securing his conquests. The invader has only to follow the frontier policy of ancient Rome, ably imitated by the modern Briton. He will buy Maroccans to fight Maroccans; pay them liberally, officer them ably, and arm them efficiently. Wild races always, and everywhere, prove how greatly gold downweighs patriotism. You can always rule the Moslem by telling him the truth, by dealing with him honestly, and by respecting his women and his religion." These words, from so eminent an Orientalist, are significant; but the first obvious obstacle to overcome will be the choice of a European deliverer.

We may commend Dr. Leared's volume as a readable and instructive account of Maghrib-el-Aksa, or Empire of Morocco, and on account of its special pleading for the salubrity of Mogador and Tangier to Europeans suffering from chest complaints. The volume is handsomely illustrated.

Adventures in Nyassaland. By L. Monteith Fotheringham. London: Sampson Low and Co., 1891. Pp. 304. *Price 7s. 6d.*

The author of this volume is well fitted to give what might be called the official account of the "little war" waged by the African Lakes Company against

the Arab slave-traders at the north end of Lake Nyassa. As an agent of the Company he was there from first to last, the leading spirit in the negotiations between the belligerent parties and the ensuing hostilities. An African trader requires sometimes to be a diplomatist, and, failing peaceful overtures, to be a fighter. Mr. Monteith Fotheringham proved himself equal to all his responsibilities. As mediator between the Wa-N'Konde and their Arab oppressors, as a loyal servant of a trading company, and as an amateur general in command of native levies he was signally successful.

The value of Mr. Monteith Fotheringham's book lies in the fact, that it may be regarded as an authoritative account of a very significant passage in the history of the European domination in Africa. We do not in the least agree with the author that the Arab hostilities were in any sense due to a religious movement. There is sufficient evidence to prove that, on the contrary, it was simply a struggle —an isolated struggle, which is bound to be repeated in other parts of Africa— between the European pioneers of legitimate commerce and the Arab slave-traders. The tardy action of the African Lakes Company was happily quickened by the energy of their agents on the spot, who at once recognised the importance of maintaining the inviolability of an advanced British outpost. In the two years' struggle that ensued, and in which only a handful of British subjects was engaged, we recognise the value of British pluck and integrity of motive in sustaining the principle of native independence. It has been proved possible for native tribes to be organised and pitted against their Arab oppressors, and to be capable of loyalty to their allies. Upon this principle of action, the slave-trade within the limits of European jurisdiction might receive its death-blow, for the identity of European and native interests in Africa is so far inseparable.

The Canary Islands. By John Whitford, F.R.G.S. London: Edward Stanford, 1890. Pp. 150. Maps and Illustrations.

Madeira and the Canary Islands. By A. Samler Brown. Second Edition. London: Sampson Low. Pp. 124. Maps. *Price* 2*s.* 6*d.*

Tenerife. By George W. Strettell. London: T. Fisher Unwin. Pp. 104. *Price* 1*s.*

These three contributions to the bibliography of the Canary Islands are not of striking originality or value.

Mr. Whitford's volume is the most capable. It gives a fairly comprehensive view of the islands, but his rambling descriptions are necessarily superficial. The illustrations and maps are the best features in the book. Mr. Samler Brown's contribution requires no apology for its appearance, as it is really a good, practical guide in small compass—perhaps too small. Such a guide was wanted. The maps, however, are extremely bad.

Mr. Strettell's "personal experiences of the island as a health resort" were very much those of the present writer. He does well to write temperately, and not to indulge in the conventional ecstasies. He makes some bad "slips" in places: *e.g.*, the Canaries are not a "continuation" (p. 10) of the Atlas Mountains, and it is absurd to talk of the "main range" (p. 12) of Tenerife. Madeira does not lie "south" (p. 36) of Tenerife. The Cañadas are not the "basin" (p. 45) of the old crater, but the local name of the passages between the tumbled lavas.

The Statesman's Year-Book, 1891. Twenty-eighth Annual Publication. Edited by J. Scott Keltie. London: Macmillan and Co. Pp. 1132.

The appearance of this valuable Annual three weeks before its usual time is greatly to be commended. Several alterations and improvements have been made.

"The headings to the pages," we are informed in the editorial preface, "have been so altered as to render the book much easier of consultation than before." But we venture to advise a still further improvement in this respect. Under British Empire, the various sections of which are grouped together, we would suggest the left-hand page bearing the words "British Empire:" and the name of the continent under treatment, and the right-hand page being devoted to the name of the country or possession. At the present time only the titles of paragraphs are reproduced over the right-hand pages, which is quite unnecessary, as they already stand out very prominently. The same principle of geographical arrangement might also be applied to the remaining portions of the book.

The editor has taken evident pains to keep his volume up to date, as we find from having tested it in several places. A considerable amount of space has been devoted to Africa; but the treatment is patchy, and in places so confused as to amount almost to misstatement of facts. There are, moreover, some inconsistencies of spelling in place-names. The editor might, indeed, with advantage, endeavour to make those portions of the book that are constantly undergoing modification, either read more lucidly and smoothly, or, failing that, the obscure passages should be entirely re-written. Another serious failing is, that the bibliographies at the end of the sectional chapters have not been kept up to date; they include the names of many antiquated volumes, and omit mentioning some of the most recent contributions of greater value.

We have one or two *errata* to point out:—The estimated population (1889) of Glasgow is given (page 22) at 530,208, whereas, by the new boundary arrangements, some 8500 acres were added to the city, raising the population to 723,995 (estimated). On page 168 the river Songwé is mis-printed Songivé, and the three or four lines that follow convey an unintelligible or misleading statement. On page 164 the river Tana is stated to be navigable for 200 miles, but Dr. Peters affirms it to be navigable for 260 miles, to near Hargazo, above which place numerous rapids occur. But the most serious discrepancies occur in the otherwise valuable table contributed by Mr. E. G. Ravenstein, on "The Partition of Africa," in which some of the totals and percentages (inhabitants to the square mile) are incorrect. No less than ten figures are wrong.

The Statesman's Year-Book fills such a prominent place among Annuals that we do not hesitate to mention these few slips, which do not detract from the trustworthiness of its information as a whole, but are incidental to such a work. Its value is universally recognised, and requires no further commendation from us.

The Government Handbook: A Record of the Forms and Methods of Government in Great Britain, her Colonies, and Foreign Countries. By Lewis Sergeant. Third Edition. London: T. Fisher Unwin, 1890. 544 pages.

The Government Handbook had been more appropriately called The Handbook of Governments. It is a succinct account of the constitutions of the states of the world. Note is taken of international relations as well as of national interests, such as religion and education; but statistical information is kept within narrow limits. As a guide to the constitutions of the world the book is extremely valuable. It has been compiled with great thoroughness and evidently with care. Seventy pages are devoted to the British Constitution, and eighty-six to the British Colonies and Dependencies. The remainder of the volume is occupied with accounts of the governments of other countries, which are classified under the heads of Republics and Monarchies. A valuable feature of the work is that the author

quotes written constitutions, charters, and Acts of Parliament in connection with all important matters. Of Mr. Sergeant's speculations on the present "political tendencies" in this and other countries we express no opinion. It should be added that the book is not an annual publication. The intention of the author is to re-issue it as occasion requires.

Hazell's Annual for 1891. Edited by E. D. Price, F.G.S. London: Hazell, Watson, and Viney, 1891. Pp. 706. *Price* 3*s.* 6*d.*

The sixth volume of this useful Annual maintains its standard of merit. It contains 3500 articles. Numerous additional biographies have been added, and the volume is brought up to date (27th November 1890). All the leading topics of the day are dealt with, and in a manner most useful for reference.

Victorian Year-book for 1889-90. By H. H. Hayter, C.M.G. In two volumes.—Vol. I. Melbourne; London: Trübner and Co., 1890. Pp. 500. Index and Map.

This Year-book is replete with information and statistics, and much value is added to it by a comparison which is instituted in so many cases between what obtains in Victoria and in other places. Thus, the proportion of males to females, population to square mile, and the estimated wealth of the different populations, are graphically set forth. The disproportion of the sexes as compared with, say Scotland, is very large. In Scotland there are 107·6 females to every 100 males, while in Victoria the proportion is 83·82 females to the 100 males. In the Colony there are 1·024 persons to the square mile, whereas in England and Wales there are 496, and in Scotland 137; or, if we take the proportion for the United Kingdom, it is 315 to the square mile. The total increase in the revenue is very marked. In 1874-5 the grand total revenue was £4,236,423; in 1888-9 it was £8,731,255; the total value of rateable property having increased during the same period from £62,221,639 to £187,558,511, the total number of properties rated being 191,042 in 1874, and 341,293 in 1889.

In Victoria the total amount of public debt in 1888 was £34,627,382; the amount of indebtedness per head of the population, £31, 14s. 10d., being equivalent to 4·55 years' revenue; and this compares very favourably with the other Australian colonies, only Western Australia and Tasmania exhibiting a slight advantage.

Some curious statistics with regard to marriages are given. The minimum age at which persons can marry in Victoria is 14 for males, 12 for females. Marriages appear to take place at a comparatively early age. It is not without interest to notice that, since 1866, 66 women from England and Wales, 16 women from Scotland, and 27 from Ireland have married Chinese. During the same period 194 women born in Victoria were also married to Chinamen. The average number of children to a marriage in Victoria is 4·23; and the highest number of births takes place in the winter season, that is, the quarter ending September. The mean annual increase, by excess of births over deaths, is 1·64 per cent. The average annual death-rate, from 1861 to 1889, was 15·78 per thousand. In 1889 the death-rate in Victoria was higher than in any of the other Australian colonies; but, when a series of years is examined, we find that the Colony comes third on the list, both Queensland and Western Australia having a higher death-rate. The tables with regard to the causes of death are very interesting and instructive.

L'Occupation des Territoires sans maitre. Par Ch. Salomon, Docteur en Droit. Paris: A. Giard, 1889. Pp. 400. *Price* 8 *francs.*

In this learned work Dr. Salomon discusses the principles of International Law affecting territory without an owner, which may be occupied by civilised Powers. It is a work which is singularly appropriate at the present time, when so much territory of the above nature in Africa has been annexed by European Powers. In an appendix Dr. Salomon gives the original text of (1st) the treaty of 28th April 1888 between the Sultan of Zanzibar and the German Company of East Africa; (2d) the royal charter granted on 3d September 1888 to the British East Africa Company; and (3d) the international declaration, relative to territorial occupation, made at Lausanne on 7th September 1888.

The Handbook of British Honduras for 1890-91. By Lindsay W. Bristowe and Philip B. Wright. Map. William Blackwood and Sons, 1890.

This work, compiled mainly from official records by Crown officers, has now reached its third year of issue, and will be found a reliable and serviceable handbook for persons interested in the colony.

Maritime Telegraph Systems, Buoys, Beacons, Tidal Signals, etc. Compiled by Victor Carlson, Captain in the Merchant Navy. Stockholm, 1890. Pp. 10, and with 44 Plates. *Price* 10 *kronor.*

Captain Carlson has compiled a useful, well-arranged, well-executed set of plates illustrating naval signals, the gay colouring of which gives the volume an exceedingly bright and attractive appearance. The matters treated of can be more easily explained by a few illustrations than by any number of words; and so we have but few pages of letterpress to a large number of fine plates representing signal-flags, semaphores, balls, lights, the French method of signalling with the arms, buoys, beacons, bells, etc., accompanied by a fine chart of the west coast of Sweden. The book, which, by the way, is most tastefully produced, is certain to prove a work of considerable utility to all engaged in the navigation of the waters of Northern Europe and off the coast of France. But its usefulness does not by any means stop at these bounds, and we can recommend the volume to all taking an interest in our ocean highways.

The Cruise of the "Alerte": The Narrative of a Search for Treasure on the Desert Island of Trinidad. By E. F. Knight. London: Longmans, Green, and Co., 1890. Pp. 328. *Price* 10*s.* 6*d.*

The sailing and return of the expedition, the narrative of which is here given, must be fresh in the minds of many of our readers, and the fact that Mr. Knight and his companions left our shores with high hopes of returning laden with treasure, but came back as poor as they set out, was related in the newspapers of the day. We now have, in this handsome volume, a detailed account of the causes that led to the voyage, as well as of the expedition itself. Having read carefully the story of the hidden treasure, with all the supporting evidence brought forward by Mr. Knight, we can hardly doubt that the plunder of Lima was brought to, and "cached" in, the island of Trinidad, situated in the South Atlantic, about 700 miles east of the coast of Brazil; but its presence there now may well be considered problematical—at any rate several search expeditions, all formed with the same object, have failed. Nor need this be wondered at. Trinidad is a strange island, and its story, if written by one having the necessary knowledge

of natural history, which Mr. Knight does not pretend to possess, would be quite as romantic in its own way as any tale of pirates, loot, and buried riches. The island appears to be entirely of volcanic and coral origin, mostly so rotten that the weather works mighty changes in a very short time, resulting in a picturesqueness of outline and constant change of surface that make the scenery and the habitation of the land alike uncanny. Immense landslips are common, and it is under one of these that the buried treasure, if it still lies in the cave where it was originally deposited, is supposed to be. The description of Trinidad is careful and lucid, making a really valuable addition to geographical knowledge, the accounts in the sailing directories and gazetteers being meagre and out of date.

But Trinidad was not the only place visited by the treasure-seekers. The Salvages were called at on the outward voyage, and an attempt made to discover a hoard said to have been hidden on one of these islets. The search, however, was neither continuous nor exhaustive, and came to nothing. This group is also well, if rapidly, described; and all that was seen and experienced by the adventurers shows that few islands stand in greater need of a revised and thorough survey than the Salvages and Trinidad. The charts now in use are not only unreliable, but actually dangerous if slavishly followed, and ought on no account to be trusted to when close in-shore.

The volume forms a lively and readable account of a romantic adventure, and ought to be popular. The illustrations are fairly good.

The Story of our Lighthouses and Lightships: Descriptive and Historical. By W. H. Davenport Adams. London, Edinburgh, and New York: Thomas Nelson and Sons. 1891. Pp. 380.

This, like most works from the pen of Mr. Davenport Adams, is an excellent specimen of the art of book-making, showing a very considerable power of research on the part of the author, with considerable skill in the way of grouping facts and rendering them effective, as well as great accuracy in detail, and some picturesqueness in description. No important fact connected with our principal lighthouses need be looked for in vain in the volume, and there is much, if condensed, information regarding beacons along the shores of our colonies and of the United States. The illustrations are both excellent and clear, and the printing distinct and pleasant to read.

The chart mentioned on p. 73 does not appear in this edition, and the want is distinctly felt. In future issues this omission ought, certainly, to be corrected.

Warwick, the King-Maker. By Charles W. Oman. London: Macmillan and Co., 1891. Pp. 243. *Price* 2*s.* 6*d.*

A volume of the "English Men of Action" series, treating of olden times, when Calais was an English seaport, and Richard Neville, Earl of Warwick, was its governor. An ardent Yorkist, he invaded England with an army, and captured London in July 1460. Eventually the Yorkist, Edward IV., was proclaimed king at Westminster, and he and Warwick turned to pacify the north. Warwick was placed in command of the Northern Border, and, invading Scotland in 1463, made peace with the Scottish regents on their despatching Queen Margaret and her French soldiers to Flanders. Warwick, however, quarrelled with his master, King Edward; and Mr. Oman points out how seldom fallen ministers have been able "to sit down in resignation and accept their fall with equanimity." He had made Edward Plantagenet king, and felt the latter's ingratitude keenly. Robin of Redesdale's rising and the battle of Edgecott led to Warwick seizing the King, with

whom he made terms of peace, which did not, however, last long. Warwick once more invaded England from France, and was master of all England within eleven days after landing at Dartmouth. King Edward had fled to Holland, but returned to England and seized London. At Barnet the armies of Edward and Warwick met face to face. Warwick's troops were routed, and he himself was slain. Mr. Oman says "Warwick's ambition took the shape of a devouring love of work of all kinds," and remarks that, although a traitor to his King, Warwick had been "wantonly insulted by his thankless master." Mr. Oman's volume is a valuable contribution to the history of a period which has seldom been impartially discussed.

Rulers of India : Dupleix. By Colonel Malleson, C.S.I., Oxford : At the Clarendon Press, 1890. *Price* 2*s.* 6*d.*

In the series of monographs on "Rulers of India," the life of Dupleix has been written by the one man who is capable of doing it well. Colonel Malleson is the recognised authority on the subject of the history of French enterprise in India, which he has thoroughly studied and mastered in all its details, and, being possessed of great literary gifts and of a clear vigorous style, he has been able to produce a work of surpassing excellence and engrossing interest. He brings out clearly the great importance of the position occupied by Dupleix in the history of the relations of European Powers to India. It was Dupleix who first saw the opening for the acquisition by European Powers of dominating political influence, and conceived the methods by which such an object could be attained. The ambitious plans he formed ultimately failed of realisation, but only because he was not better seconded by his subordinates, and did not receive adequate support from the authorities in France. It was by adopting his plans and his methods that the English gradually built up the British-Indian Empire. The history of his schemes, of the success which for a while crowned them, of the reverses he sustained, and of his courageous struggle against adverse circumstances, is one of thrilling interest, and is told with great power. The introductory and concluding chapters, which tell the story of the undertakings of the French down to the time when Dupleix came to the front, and of the last efforts of the French to wrest political supremacy from their rivals, are models of condensation and clearness. The writer is thereby able to give the whole history of French enterprise in India. The narrative is animated throughout. Enough of detail is given to make the situation always intelligible, but never so much as to be wearisome or to mar the general effect of the picture, or divert attention from the really important movements and events, and obscure the great part played in them by Dupleix.

Sir Francis Drake. By Julian Corbett. London : Macmillan and Co., 1890. Pp. 209. *Price* 2*s.* 6*d.*

This is one of the excellent series devoted to "Englishmen of Action." Mr. Corbett declares that "of all the heroes whose exploits have set our history aglow with romance there is not one who so soon passed into legend as Francis Drake." His first important expedition ended disastrously, owing to Spanish treachery. This terminated the long commercial intimacy between England and Spain, and led to Drake's second expedition in 1572, which spread dismay throughout the Spanish Indies. Crossing the Isthmus of Panama, Drake and his comrades were "the first Englishmen" to gaze on the Pacific. (Magellan, however, in his great expedition—1520—had some English sailors on his vessel, which first breasted the waves of the Pacific.) In 1575 Drake destroyed the Scottish galleys off the

isle of Rathlin. Three years later he circumnavigated the globe, sailing through the Straits of Magellan, capturing Spanish treasure-ships along the west coast of South America, and, with his own ship "literally ballasted with silver," continued, *viâ* Java and the Cape of Good Hope, round the world until he landed at Plymouth. Queen Elizabeth banqueted on board his ship, and knighted him. Drake was appointed lieutenant to Howard, the Lord Admiral, to meet the Spanish Armada, and Mr. Corbett is of opinion that to Drake is due its defeat and destruction. Drake's life, as told by Mr. Corbett, reads like a romance. It is an exceedingly graphic account of the career of one of the greatest of modern Vikings.

The Dictionary of Statistics. By Michael G. Mulhall. Part I. London: George Routledge and Sons, Limited, 1891. Pp. 64. *Price* 2*s.* 6*d.*

This is the first part of what promises to be a work of reference of the highest value to geographers and to all who, by choice or by necessity, desire to obtain a knowledge of the world's trade, general state, and progress. The principal article in this part is that on Agriculture, covering nearly fifty-two pages, and affording statistical tables such as are likely to meet the requirements of most students. Other articles are on Aërolites, Age, Alcohol, Amphitheatres, Anatomy, Animals, Anthropometry. These are all more or less full and instructive; and should future numbers attain to the same standard as this, the first part, no library will be complete without the work. It is clearly printed, and is accompanied by one plate. The price is very moderate.

Itinéraire Général de France par Paul Joanne. Lyonnais, Beaujolais et Bresse. 3 Cartes et 2 Plans. Pp. xxiii + 237. *Alpes Dauphinoises en deux parties.* Première Partie, contenant 4 Cartes, 5 Plans et un Panorama. Pp. xlii + 395. Paris: Librairie Hachette et Cie, 1890.

These guides are very similar in style to those of Meyer, but the maps are better executed, and the covers stronger and more tasteful. The accounts of the towns and routes are very full, and a brief historical notice is given of places where important events have occurred. The method, common also to Meyer's guides, of giving a list of walks and excursions in the neighbourhood of health-resorts, is an excellent one. On the other hand, we are doubtful as to the expediency of incorporating information respecting hotels, carriages, etc., with the index. Though, of course, less imposing than the mountains of Switzerland, the Alps of Le Dauphiné contain plenty of fine scenery, of which little is known to the majority of English tourists except the few picturesque glimpses obtained in crossing into Italy by the Mont Cenis route. Those also who desire to explore districts unfrequented by the general mass of tourists often find a difficulty in procuring a handbook containing sufficient details. This want is supplied, so far as the districts mentioned in the titles are concerned, by these volumes, which are of a portable size, and would be still less bulky were they not considerably increased, as is too commonly the practice in France, by an inordinate number of advertisements.

Die freie Hansestadt Bremen und ihre Umgebungen. Bremen, 1890. Pp. 432.

We are indebted for this admirable account of the city and environs of Bremen to the meeting there of the "Gesellschaft deutscher Naturforscher und Ärtzte," in honour of which the Medical, Natural History, and Geographical Societies of Bremen prepared this volume. The numerous plans, maps, and illustrations which

it contains, besides the letterpress, which is contributed by the most competent local authorities, combine to form a work of no ordinary value. From an interesting article we observe that the Geographical Society of Bremen was founded in 1876, and owed its origin to the interest taken by the Bremen citizens in the German expeditions to the North Pole.

The Northern Counties Red Book. Inverness : *The Northern Chronicle* Office, 1891. Pp. 88. *Price 3d.*

This year's issue of the *Red Book* contains all the features which in the past have made it an indispensable companion to every one having business connections or interests in the Northern Highlands. One or two new lists are included in this edition ; but why are not the County Councillors for Caithness given as well as those for the other northern divisions ? This omission ought to be rectified in the next issue, and a map, showing the new county divisions, would be an addition of some value.

Reid's *Leith Tide-Tables.* Leith : Mackenzie and Storrie, 1891. Pp. 172.

A very attractive little book, with a distinct chart showing Leith harbour, the docks and their surroundings. As all the information usually contained in directories of this kind is included, it ought to prove a most useful guide and help to those having marine connections with the port of Edinburgh, or with those of Granton, Burntisland, and Dundee.

Barker's Facts and Figures for the Year 1891. Edited by Thomas P. Whittaker. London and New York : Frederick Warne and Co. 328 pages. *Price* 1*s.*

This new annual differs from those already in existence in devoting special attention to statistical information on moral, social, physical, economic, and political subjects. Much of the information given is interesting rather than practically useful. There is evidently room for improvement in future issues. The list of British dependencies, for example, is neither complete nor well-arranged.

Tales of Old Travel. Re-narrated by Henry Kingsley, F.R.G.S. With Illustrations. London : Macmillan and Co., 1890. Pp. 368.

The subjects chosen for narration have been selected with judgment, and the tales are told in a sufficiently interesting manner, although a somewhat involved style and eccentricities in punctuation frequently mar the enjoyment of the careful reader. The book ought to form a welcome present to young people. The type is large and distinct, and some of the illustrations are spirited.

The Admiralty Falsification of the "Challenger" Record. Exposed by William Leighton Jordan, F.R.G.S., Assoc. Inst. C.E. London, 1890. Printed by Spottiswoode and Co. Pp. 35.

Mr. Jordan brings a serious charge against the Admiralty and the *Challenger* Commission, and fails to establish his case. The book almost wholly consists of official letters, and is a remarkable testimony of the long-suffering and earnest desire to convince the author displayed by the heads of department with whom he corresponded. The pamphlet is a curiosity in its way, and may be read for amusement, for of instruction it contains little.

60
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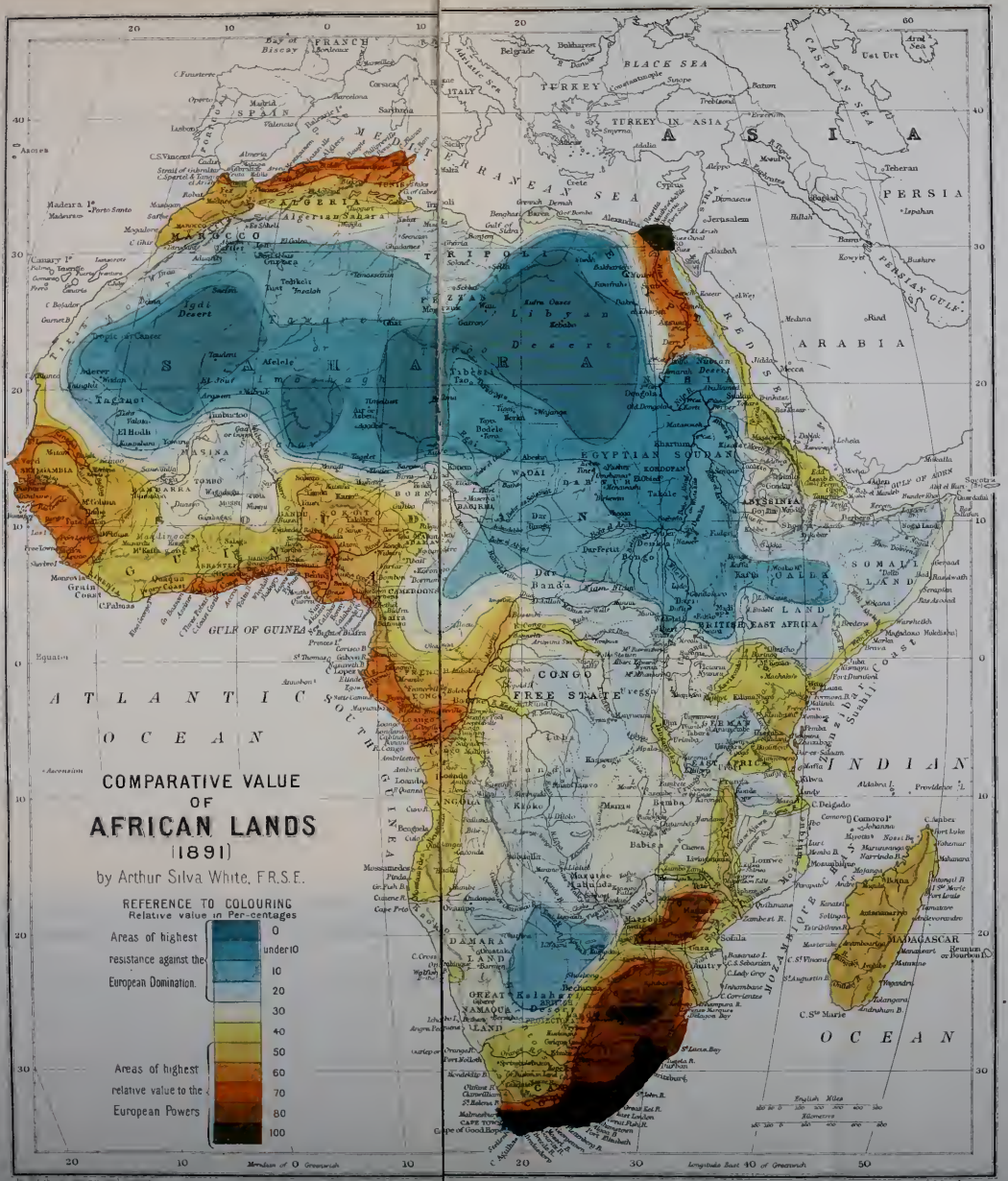
COMPARATIVE VALUE
OF
AFRICAN LANDS
(1891)
by Arthur Silva White, F.R.S.E.
REFERENCE TO COLOURING
Relative value in Per-centages
Areas of highest resistance against the European Domination.
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Areas of highest relative value to the European Powers
50
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80
100
ATLANTIC OCEAN
INDIAN OCEAN
GULF OF GUINEA
BLACK SEA
TURKEY IN ASIA
PERSIA
ARABIA
EGYPTIAN SOUDAN
CONGO FREE STATE
BRITISH EAST AFRICA
MADAGASCAR
GREAT NAMAQUA LAND
DAMARA LAND
Meridian of 0 Greenwich
Longitude East 40 of Greenwich

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

BRITANNIC CONFEDERATION.

[The following is the first of a special series of papers on the subject of "Britannic Confederation." The *provisional* list of subsequent papers, with the names of the authors, includes (2) Britannic Confederation, from a Colonial Standpoint (Principal M. H. Hervey), (3) The Physical and Political Bases of National Unity (Professor Edward A. Freeman), (4) The Commerce of the British Empire (George G. Chisholm, Esq.), (5) Tariffs, in their effect on International Commerce, etc. (Professor Shield Nicholson), and (6) The Growth and Consolidation of the British Empire.]

I.—A SURVEY OF EXISTING CONDITIONS.

By Sir John Colomb, K.C.M.G., M.P.

Political terminology is generally difficult, but the title that has been selected for the series of papers to which the present one is introductory is more than usually free from objection. The substantive is well chosen, because the federal union to be attained in the scattered Empire of the Queen must necessarily assume the looser form of a confederacy, and not that of a federation, strictly so called. The adjective is equally apt, since "British" is so constantly used in the narrower, insular sense, whilst "Britannic"—the territorial title of the sovereign of these realms, who is to all the world "Her Britannic Majesty"—has a wider range of association, and fitly expresses the larger sweep of the idea it is desired to emphasise. If it be not too late to change, the Imperial Federation League might with advantage adopt the title at the head of these papers.

To answer the question, "What is the empire of Her Britannic Majesty?" we must turn first to geography and then to history. Geographically, the first thing noticeable is the scattered character of the Empire that is usually coloured red on the maps. It literally encircles

the globe east and west, north and south. If it were not so scattered the first thing to strike the eye would be its vast extent, more than nine millions of square miles of the earth's surface, a-fifth part of the whole habitable globe, the largest empire of the ancient or modern world. These characteristics lie patent. But, if we begin to look closely and to analyse, two other features shape themselves that have important bearings. One of these is the distribution of the territories between the temperate and the torrid zones; the other the isolated portion of the little land that gives its name to, and is the political centre of, this world-embracing Empire.

Of these characteristics the scattered position of the component parts of the Empire and their climatological distribution are the two that have the most direct bearing on the present subject. The distribution of the territories between temperate and tropical climates enables us to draw a sharp line between the tropical and the temperate countries. The political confederation of the Empire can refer only to those countries where men of British race live from one generation to another under free British political institutions. Whatever the more remote future may have in store, the present question must leave out of account those tropical portions of the Empire inhabited, and only capable of permanent habitation, by the dark-skinned races, governed by the vicegerents of Her Britannic Majesty, and not intrusted with the free Briton's right of self-government, still less therefore to be endowed with the privilege of sharing in the government of other men of British race. The only point of the question that affects them is whether they would continue to be governed by the United Kingdom alone, or by a united empire. When we talk, then, of a Britannic confederation, we must really be thinking of the Britannic Empire lying in temperate or sub-tropical latitudes; and that, for practical purposes, at the present time, resolves itself into the United Kingdom of Great Britain and Ireland, British North America, British South Africa, and Australasia.

The second of the two characteristics having a direct political bearing on our subject, the scattered position of the four great groups just enumerated is fundamentally responsible for the existence of such a question at all as that which now confronts us. If these countries, inhabited as they are by a population almost entirely of common origin and otherwise homogeneous, had lain in geographical contiguity, there would never have arisen such a condition of affairs as we see at present in the political relations of each part of the whole to the centre and to the parts. There might, indeed, and, among a people so wedded to self-government in local affairs, no doubt would have arisen, the need for some loosening of the central authority over such matters by the adoption of a federal system. But the need for drawing closer would never have occurred, because the existing absence of almost every substantial political tie would never have resulted under such geographical conditions. It is distance that has produced this result. When the colonies in the temperate latitudes, inhabited by Britons, grew out of being governed on the same principles as those in the tropics, as mere dependencies of Great Britain, it was their distance from the seat of government that

prevented their incorporation into the United Kingdom, or a legislative union being thought of, while, as to the federal idea, it was not until recently that it has come to be regarded by us as a *via media* between complete legislative union and the absence of all real political union whatever. There were undoubtedly other causes determining the direction that colonial self-government then took. But, if the colonies had been newly-opened countries next door to us, those causes themselves would never have been called into existence. It was geographical position that lay at the root of the developments that have taken place.

Historically, the actual course of events has been briefly this. All colonies and plantations having originally been treated alike—that is, both nursed and governed by Britain and from Britain—those that lay in temperate regions, and had no native population of which any account had to be taken, but were inhabited entirely by men of British origin, became little Britains, and after a time claimed the same amount of political freedom and the same political institutions as were enjoyed by their brethren in the mother-country. Distance making legislative union impossible, and federation not being "in the air," this political freedom was conferred by creating local Parliaments, and placing them in the same position towards the Crown, represented by the governor, as that held towards it directly by the Parliament of the United Kingdom. Nominally the Parliament of the United Kingdom as well as the Crown retained supreme authority over the Parliaments so constituted. Practically the power of the Parliament is a reserve force to be called out of abeyance only in great emergencies such as that which, while we write, has arisen with regard to Newfoundland; while that of the Crown, acting through the executive government of the United Kingdom (as distinguished from the Crown, represented by a colonial governor and acting through a colonial executive), is not much more substantial. The political connection between any colony and the United Kingdom is of the slenderest; between any two colonies, except where it has since been created—as between the colonies of British North America by Canadian confederation—there is none at all.

But before we can get a complete bird's-eye view of the general situation we must note some other circumstances that accompanied the grant of parliamentary self-government to the colonies. With the right to manage their own domestic affairs the government and people of the United Kingdom also made to the colonists two free gifts of a strictly material nature, and at an enormous sacrifice to themselves not fully realised at the time. The first and greatest of these gifts was nothing less than the fee-simple of the vast territories, on the fringes of which they had settled.

The vastness of this unconditional and unreserved bounty is even now scarcely appreciated. The sacrifice it entailed on the mother-country is hardly recognised at all. It is not only that the heritage of the whole race was made over absolutely to a few mere handfuls of its members, so that now a native of Great Britain has no more property in and no more rights in or concerning the territory of Victoria, for instance, than any Frenchman or German possesses, and may even be refused permission to

enter that territory if his pecuniary means fail to come up to a certain standard: that is not all. There was another and directly pecuniary sacrifice made when these lands were so lightly given away. The Empire of Great Britain has cost some eight hundred millions to build up. The National Debt was a mortgage upon the whole of the territories composing that empire. Yet these large and fertile lands, containing unknown reserves of wealth, were simply given away to a few favoured members of the race, freed from all responsibility for the mortgage debt that lay upon them, the whole burden of which remains on the shoulders of the people of the United Kingdom. Nine-tenths and more of the area of land charged with its repayment has been released, and the whole stands secured upon the remaining tenth.

After this it seems almost a small thing to come to—but it was no small thing—the second pecuniary gift that accompanied the concession of self-government to the colonies. The people of the United Kingdom further gave them the right of levying all taxes, both of customs and inland revenue, and applying the proceeds for their own exclusive benefit. And, negatively, they required from them no contribution of any kind whatever in respect of those imperial services, supported by the United Kingdom, of which the colonists enjoyed the advantages especially with themselves.

These imperial services consist of the naval and military, the diplomatic and consular, and the Colonial Office staff. The United Kingdom keeps up the Colonial Office for the purpose of maintaining what may be called the discipline of the Empire. For example, Newfoundland was recently allowed to negotiate the basis of a reciprocity treaty with the United States. Canada objects that its terms would be injurious to her. The Colonial Office has to adjust these conflicting interests; and we have lately read the kind of language the Newfoundlanders use towards that Office in consequence. It is by means of the first four named services that the foreign relations of the Empire, whether in peace or war, are conducted. These relations accordingly remain under the sole control of the government and people of the United Kingdom. When, therefore, we speak of the political independence of the Colonies, there is this very large deduction to be made: that, whereas they are self-governing and mutually independent in respect of their domestic affairs, in respect of their foreign relations they remain, constitutionally, in as completely a dependent position as any of the tropical possessions of the Crown: and herein will be found to lie the whole *crux* of the matter. When the Colonies were granted the right of self-government, the grant was partial only; they were not endowed with the imperial franchise, because they were not then in a position to undertake the corresponding imperial obligations and responsibilities. The imperial franchise still remains vested exclusively in the people of the United Kingdom, and upon them exclusively devolve all the responsibilities attaching to the defence of the Empire in time of war, and the maintenance, defence, and advancement of the rights and interests of individual British subjects, of the several countries in the Empire, and of the Empire as a whole in time of peace. There are other aspects in which the

imperial relationship may be viewed, but herein lies its fundamental difficulty.

We are now in a position to look into the situation more closely. What is the actual working of the present anomalous arrangement? To the Colonies it means that, while on the one hand they escape altogether the political difficulty, the labour and expense, the money-tax and the blood-tax, involved in responsibility for the maintenance and defence of the Empire in all its foreign relations, they find themselves, on the other hand, without any constitutional voice in foreign affairs—even when these nearly affect their own special interests—and are unable to carry out or procure the adoption by the mother-country of any foreign policy, however much they may desire it. Witness the annexation of New Guinea, attempted, on behalf of Australia, by the colony of Queensland, but vetoed by the Government of the United Kingdom, and the whole annexation policy of Australia in the South Pacific continually pressed upon the Home Government, and that government's steady refusal to carry it out. They find themselves at the same time exposed to the inconvenience and risks of wars entered upon by the Government of the United Kingdom—wars in which it is possible they may—some of them at any rate—have no direct interest, and in the making or ending of which they have no part or voice.

How does this affect the United Kingdom? In the first place the people of the United Kingdom have to bear the whole pecuniary expense of the four services concerned with foreign affairs (with the exception of some military contributions from India and the Crown Colonies), the advantages of which are shared by all parts of the Empire and every individual in it alike. And, more than that, they may be called upon to undertake a war, involving untold loss and misery and enormous expense to themselves on account of some single one of the Colonies. On whatever account the war, the whole Empire suffers in some way, or at least runs the risk of suffering, but in all cases the United Kingdom immeasurably the most of all. Colonists, referring to these risks, sometimes talk of Great Britain going to war in some cause that does not concern them. There might be a war in which not all the Colonies would have a direct interest, as, for instance, if we went to war with France on behalf of Newfoundland, or with America on behalf of Canadian interests in Bering Sea or elsewhere. Australasia and South Africa would have no direct interest there, but neither would the United Kingdom itself. Historically, the facts are all the other way. Britain's quarrels for the last three centuries, wherever the theatre of war may have been, and whatever the ostensible *casus belli*, have not been fought on grounds concerning Britain herself, but have been in one way or another Colonial wars; and Britain's only danger of war now lies, not at home, but in one corner or the other of the outlying Empire. A war with Russia, even, would not in the future any more than in the past arise from any danger threatening these islands, but from the danger that threatens our lines of communication and those of the Colonies, that threatens India, and, more remotely, Australasia in the South, and Canada in the North, Pacific.

The existing anomalous condition of the imperial relationship has

grown up, as we have seen, from the partial nature of the transition from the absolute dependence of the Colonies to the position they now enjoy. So long as they were in a completely dependent position, and the territories themselves remained the property of the people of Great Britain and Ireland, it was only right and natural that the mother-country should mainly undertake the work of imperial defence as well as the control also of local defences. When the Colonies obtained domestic self-government and the ownership of their own lands they were left to supply their own local defences, for which this country then ceased to be responsible, but were not then wealthy enough to undertake the expense, or politically advanced enough to be intrusted with the responsibility, of sharing in any imperial obligations, whether of defence or otherwise. But their growth has been, and continues to be, very rapid; and things have reached a stage now, when on both sides it is felt that the present loose and anomalous relationship is unsatisfactory, for different reasons, to both parties to it, and fraught with danger to the maintenance of imperial unity. The anomalous nature to-day of a state of things that was all very well even a generation ago becomes transparently plain when we compare the material condition of the Colonies then and now.

In a paper which I read in 1886 before the Royal United Service Institution upon "Imperial Federation: Naval and Military," some of the most striking comparisons were brought out between the material development of the Empire at the period of the great Exhibition of 1851, and at that of the Colonial and Indian Exhibition of 1886. These were illustrated by diagrams; and it is not a little significant that many items in the comparison, in which the Colonial portion bulks large in 1886, were in 1851 too small to admit of illustration on the scale adopted! The "Growth and Consolidation" of the Empire is, I understand, to form the subject of a special paper in this series; but, without trenching unduly on the province of that paper, it will be useful, in this preliminary exposition of the case for consideration, to notice some of the main outlines in the picture of the Empire drawn in the lecture referred to, and some further statements made by myself, in the House of Commons, in dealing only a month or two ago with the question of the growth of Colonial sea commerce and the need of naval defence.

In 1851 the trade of the Colonies (which throughout must be taken to mean British North America, Australasia, and South Africa, as distinguished from Dependencies, India, Ceylon, West Indies, &c.) amounted to 24 millions pounds sterling. In 1884-85 the same trade had risen to 176 millions. A similar comparison for the whole Empire between the two Exhibition years, 1851 and 1886, brings out the fact of the following astounding growth. In 1851 the total trade of the Empire, United Kingdom, Colonies, and Dependencies, added together, amounted to not quite 400 millions (£399,765,796), of which that of the United Kingdom counted for 324 millions, odd. In 1886 the total stood at 1079 millions odd, of which the United Kingdom supplied 644 millions, the Dependencies 258 millions, and the Colonies the balance of 176 millions.

Between the same periods, 1851 and 1886, the growth in shipping

annually entered and cleared at British ports was equally remarkable. At the former date the movements of shipping in the Colonies, being less than 5 million tons, could not be illustrated in the diagrams on the scale necessarily adopted to bring the measurements for the whole Empire within manageable limits. It was then only 4 millions and three-quarters tons, while in 1884-85 it had risen to 26 millions and a half. The totals of such movements of shipping for the Empire, for 1851, gave a little over 25 millions and a quarter tons (25,283,241), of which the United Kingdom had 14 millions and a half. In 1886 the total stood at 141 million tons. And here, it is to be noticed, the proportions have to be reversed. The share of the United Kingdom is 64 millions against 77 millions provided by the Dependencies (51 millions) and the Colonies (16 millions).

The bearing of these figures on the question of Imperial Defence, which means primarily the defence of sea-borne commerce, is, of course, obvious; and, in the same paper, two other comparisons were made, giving direct point to this connection. One of these compared, on the one side, the trade of the five principal countries (exclusive of the United States) having sea-boards on the Pacific Ocean, and, on the other, their effective naval power. The countries were Peru, Japan, Chili, China, and Australasia, in the order of an ascending scale of their commerce. The trade of Peru and Japan was comparatively insignificant; that of Chili about a quarter, and of China less than half, of Australasia. On the other side, we find that Peru's navy had recently been destroyed in the war with Chili; Japan at that date maintained 7 sea-going modern cruisers, Chili 8, and China 7, irrespective in all cases of ships of other classes. What do we find against Australasia, whose trade exceeds that of all the others put together? The entry at the time was, "Australasia maintains no ocean cruisers."

The other table compared the Colonies (in the same sense as here throughout) with the United States of America—a country inhabited by an equally industrial and peace-loving population. The area of the Colonies is a little over 7 millions square miles; that of the United States a little over 3 millions. The Colonial trade was 176 millions, against 293 millions for the United States; the revenue 37 millions and a half, against 72 millions and a half. But the "Expenditure on War Forces" by the States was 11 millions and three-quarters, while that of the Colonies was "incapable of being shown on the diagram," being but little more than the odd three-quarters of a million (£802,559).

On the motion for going into Committee of Supply on the Navy Estimates in March last, I raised a debate by "calling attention" to the growth of colonial maritime commerce, and the increase of British naval responsibilities caused thereby. I pointed out that our Home population was now dependent on maritime trade for food, and, I might have added, for the means of buying it to be gained by working up the raw materials, the supply of which also depends on the safety of our ocean-trade. Formerly, danger to our commerce was virtually confined to European waters and the North-West Atlantic. The area of danger now includes every sea in the world. At the close of our great European war (1815), the commerce to be protected was that of the United Kingdom

alone. At that time, though we had already asserted the supremacy of the seas, and had only the germs of an outlying empire to defend, the naval estimates were £22,000,000. For the present year the estimate is only something over £14,000,000; and we have to protect an immense empire, having a vastly extended area and an enormously increased sea-trade.

The increase over, roughly, fifty years—from the commencement of Her Majesty's reign—is shown by the following figures. In 1837 the annual revenue of the United Kingdom was 55 millions, and the annual sea-commerce was valued at 155 millions. At the present day the revenue is 89 millions, and the sea-commerce 744 millions. But a much larger proportionate growth of sea-commerce is shown on the side of the outlying portions of the Empire. The aggregate revenue of these was, at the beginning of the reign, 23 millions, against 105 millions now; while the sea-trade, then under 55 millions, has now risen to 460 millions. During this period, therefore, the revenue of the United Kingdom has increased only by about one-half, and the sea-trade has increased five times, while the revenue of the rest of the Empire has increased nearly five times, and its sea-trade about nine times. Of 194 millions of revenue raised last year throughout the Empire, 105 millions were raised in the outlying parts, and that portion constantly increases, whilst that of the United Kingdom remains about stationary.

Here, then, we have a very pregnant comparison indeed. But there is more behind. The commerce of the outlying portions of the Empire is capable of division into two classes—that carried on with the United Kingdom, in which, therefore, the United Kingdom is equally interested, and that carried on independently. The former is put down at 187 millions, the latter at 273 millions a year. It is accordingly not only the trade of the rest of the Empire rather than that of the United Kingdom which has so greatly increased the bulk of the commerce requiring naval protection, but it is in chief part their independent trade in which the United Kingdom has no direct interest whatever. This independent sea-borne trade of the outlying portions of the Empire is four times that of Russia, two and a half times that of Italy, about half that of the United States, nearly equal to that of Germany, and about three-quarters that of France; and it is increasing every year at such a rate as to be fast overtaking the sea-borne commerce of the United Kingdom itself.

And how is the naval protection of this commerce—the commerce of the whole British Empire, of which so large a proportion is of this character so brought out—how is its protection provided and paid for? Let it be borne in mind that the commerce of the United Kingdom requiring protection is valued at 744 millions; that of the rest of the Empire 460 millions, of which 273 millions have no connection with the United Kingdom at all. Well, the United Kingdom finds 14 millions and a quarter of the cost, the rest of the Empire 381 *thousands*. Of this not very magnificent total India alone finds 254 thousands (two-thirds of which, however, is for troopships and harbours, not for sea-going vessels protecting trade), and the balance, except some few hundreds, consists of the £126,000 to be contributed from Australasia towards the cost of the local squadron to cruise in her own waters exclusively. *Out of every*

pound spent during the current year for the naval protection of the Empire the outlying portions will spend about $6\frac{1}{4}d.$, *and the United Kingdom the balance of* $19s.\ 5\frac{3}{4}d.$

Enough of these comparisons, taken from the sources already indicated, have been given to demonstrate very clearly two or three propositions. First, the provision made for imperial defence is very far indeed from keeping pace with imperial property requiring defence. Second, the growth of commerce, which causes the increase of property to be defended, is much more rapid in the outlying Empire than in the United Kingdom; and of that growing commerce outside the United Kingdom the major part is independent, and has no direct interest whatever for the United Kingdom. Third, the United Kingdom bears practically the entire burden of the defence of the commerce of the whole Empire, to which India contributes an insignificant quota, and the self-governing colonies simply nothing at all—for the other small quota from Australia figuring in the estimates is devoted to local, not imperial, defence, and is demonstrably no relief whatever to the expenditure of the United Kingdom, which was increased *pari passu* with that contribution.

If we turn for a moment from the navy to the army, we find that towards the expense of this arm of defence the self-governing colonies contribute nothing at all, while the dependencies do. Looking at the diplomatic service we see at this moment the whole burden of Canada's dispute with the United States being borne by the British Foreign Office and its diplomatic agents while the Canadian government merely look on and criticise, and they and the whole people of Canada are able to devote themselves to fighting a general election in which this grave question plays no part whatever. We see also, at this very moment, the Foreign Office and the Colonial Office engaged in most difficult negotiations with France on behalf of Newfoundland in her dispute with that Power, while, again, the government and people of Newfoundland not only lend no help—not only even stand by and criticise—but, in addition to criticising, refuse to move a finger to help their champion. Apart from the diplomatic service proper there is the Consular establishment of Great Britain in every country on the face of the globe, by means of which every business man in the colonies is being assisted either directly or indirectly year in and year out. In short, every individual colonist gets the full advantage of being a citizen of one of the oldest, richest, and most powerful States in the world without either directly or indirectly paying one penny-piece for the privilege.

Such a condition of affairs has not in it the elements of permanency. It is possible, on the one hand, that when the true state of the case comes to be widely known and appreciated in the United Kingdom, the taxpayers may become restive under such an apparently one-sided bargain. On the other hand, the Colonies, though well enough satisfied at present with an arrangement that relieves them of expense and responsibility, may not always be content, even at a saving to their pockets, to have their foreign relations managed for them as they now are. Moreover, there is room for very grave doubt whether the protection of the mother-country would prove, in the actual event of war, as effective as is assumed.

In addition to the probability of the fleet proving inadequate to the large responsibilities to be faced, it is pretty certain that, in the event of the food-supplies of the United Kingdom being seriously threatened, the British tax-payer would insist on the whole strength of his navy being concentrated for their protection. At present, however, the colonists do not seem to concern themselves about this.

There are two directions in which men's thoughts are moving in the Colonies in connection with this question. Among some there is a tendency to consider the complications and risk of being dragged into war entailed by the Imperial connection too high a price to pay for the gratuitous support and protection afforded by the mother-country. Another and more high-spirited feeling is also working against the continuance of the existing relations. Men in the Colonies, who have minds above greed alone, and can speak their minds without having the fear of ignorant constituents before their eyes, feel the irksomeness and humiliation of their present position. They cannot tolerate that their otherwise free countries should continue, *vis-à-vis* of the outside world, to be in the position of mere dependants, living under the protection of a wealthy patron. Such men desire accordingly either to come forward and take up the full citizenship of the Empire, or to sever the connection altogether, and stand boldly before the world in their own right and by their own strength. Many men, and not a few of considerable political eminence, have spoken openly of separation, as we all know—unless, as perhaps we ought, we except Lord Carrington, whose high office in New South Wales appears to have prevented his knowing what was notorious to every one else, and was openly canvassed in the press and in Parliament. Now, however much the idea of separation is to be deprecated by patriotic Britons in all parts of the world, it has to be remembered that the time is past for disputing the right of the great groups to sever their political connection with the mother-country, if in their wisdom, or unwisdom, they should definitely and solemnly elect to do so. The whole case to the contrary was given away when the Colonies were granted responsible government, and with it the absolute ownership of their land, freed from its share in the public debt, and the complete control of their finances and tariffs without any reservation of any sort or kind calculated to maintain the political union inviolate. In fact, the policy which found public expression in the speeches of the apostles of the old Manchester School determined the policy of British government in those days. The Colonies were repeatedly told they were free to go, not without a hint that the sooner they availed themselves of that freedom the better. Responsible government was conceded as a stepping-stone to independence, which was officially regarded as their natural destiny.

Now, however, a large numerical majority of the people on both sides the sea, and almost all the leaders of opinion and far-seeing and responsible members of the community throughout the Empire, recognise that separation would be a mistake. But there is, in consequence of the fatal errors of policy committed by a former generation of British statesmen and publicists, an alarming amount of leeway to be made up.

The question of the maintenance of the imperial connection anywhere is an open one; and it is this uncertainty as to the future that paralyses community of action. If it be practically an open question whether or not the Colonies will one by one cut themselves adrift as and whenever it suits their individual convenience to do so, it is the height of folly for the United Kingdom to continue to do everything for them, and treat them in all respects in a manner only reasonably compatible with a sense of their permanent union with itself. On the other hand, the Colonies naturally desire to prolong the present happy state of things; while in some cases, perhaps, they would in any circumstance hesitate to take an irretrievable step in the direction of a closer union on a permanent footing, not having quite made up their minds what they would best like to do ultimately, when the present halcyon days come to an end for them.

Until the question is fairly faced—as it will have to be faced before very long—no great progress can be made. It behoves both sides, therefore, to consider what the effect of separation would be. Without going over the whole ground, it is easy to show upon the one case of naval and military defence that the interests of both the mother-country and the Colonies alike are bound up in the maintenance of political unity. Both alike are equally interested in keeping open and protecting from interference the great trade-routes of the world in time of war as well as in peace. As it has been well put, "Above all questions of free trade or of fair trade is the paramount question of safe trade."

To the United Kingdom the safety of its food-supplies and the routes for what is a necessity second only to the supply of food—the supply of the raw materials that support its mills—is of absolutely vital moment; and it is the possession of naval bases in every sea that largely contributes to this safety. If Australia, for example, were independent, and an alien though friendly nation, her ports, dockyards, and coaling-stations would be open to the ships of Her Majesty's navy when engaged in war, only on precisely the same terms as to those of the enemy. While, if Australia were at war with another Power, France, for instance—Britain being neutral—this country would be powerless, while maintaining her neutrality, to prevent the blockade of Australian ports, whereby our supplies of wool would be cut off from that quarter. The case, in fact, might reproduce the results that followed in our centres of industry from the blockade of the cotton ports in the American civil war.

Again, if for Australia we put Canada, the same results would follow, with the difference that for "wool" we must now read "food." Canada is more and more becoming, and likely to become, the granary of the United Kingdom, so that our food-supplies from that source increase in importance every year. Or, to complete the circle, let us suppose South Africa independent. We are at war, and South Africa is neutral. Result: our enemy's fleet can do that which it cannot do now—coal at the Cape, and steam on to the attack of India or Australia.

To the Colonies, the first and most palpable result of separation would be felt on the financial side. They depend for their development on the public and private loans obtained in such abundance from England; and the golden stream, if it did not dry up, would promptly cease

to flow so smoothly, on such easy terms, to countries no longer under the British flag. "Cheap money" is to these young communities as the breath of their nostrils. They are deeply anxious now to obtain the right of having their public stocks placed on the list of investments sanctioned for trust funds, in order to raise the price of their stocks, and so enable them to obtain money still more cheaply. Obviously, the effect of separation would be to lower these stocks and their credit, public and private, very materially; and this is a contingency their politicians and public men have no desire to face.

Just at the time when facilities for borrowing were thus seriously checked, they would at once have to set to work and undertake expenses beyond any they have ever dreamt of to provide for their security against foreign aggression. They would have to set up a complete naval equipment—ships, guns, dockyards, arsenals, an Admiralty Department, and a force of officers and seamen; some would have to materially increase their military forces, horse, foot, and artillery; and they would have to set up a Foreign Office, with a staff of diplomatic representatives and Consular officers in all the civilised and half-civilised countries with which they have any dealings, political or commercial.

Much of this seems scarcely to have suggested itself to the run of politicians and writers in the Colonies. They have thought something of the question of defending these shores from foreign enemies, but have for the most part altogether failed to get a real grasp of what that means. They think that, as they already provide for the land-defence of their own coasts, the only addition they would have to make would be at most the establishment of a naval squadron of their own for their own waters, to replace the ships of the Imperial navy now stationed there. This is a very superficial view indeed. The cardinal fact of imperial defence is that the safety of each part depends upon the aggregate strength of the whole force of the Empire. It is not alone the few ships on the Australian station (to keep to the same country for illustration) that render Australia safe from attack. It is also the ships in European waters, in North Pacific waters, and elsewhere throughout the world, that, by closing up the hostile ports of issue at the commencement of a war would prevent the despatch of an expedition in force too great to be resisted by the squadron of local defence. Moreover, it is not the fear of that squadron or of Australia's land-defences that would make a foreign Power hesitate on occasion to attack her, but the knowledge that the whole power of the British Empire is behind her.

The effect of this is found in peace as well as in war. Suppose Australia independent, and having her representatives in the capitals of Europe, with what sort of voice could they speak? What force lying behind them would give a sanction to their remonstrances or their threats? For passive defence, but little; for effective action in the offensive operations of defence, none at all. No; it is the power to back a word with a blow that gives effectiveness to words; or, where the case does not go to such lengths, it is the authority and prestige of a great, powerful, and historic nation, having a place among the Powers of the world, that cause the voice of its ambassadors to be listened to with respect, and

their words to carry weight and influence. Of all this, in peace and war, the colonies have now the incalculable advantage, though they scarcely recognise it. They would find out the difference all too soon and too surely if they threw away their birthright, and found themselves ranking in the world with the groups of republics in South America.

And if the power of the United Kingdom, strengthened at present only by the vague and shadowy reserve of unapplied force, afforded by her outlying colonies and dependencies, is so great as it is now, what would not the might of the Empire become if all its scattered resources were welded into one homogeneous whole? Under a complete federation for defence with an imperial navy, and each part doing its share of land-defence and co-operating with the navy, in pursuance of an ordered and uniform system, the effective power of the Empire for defence would be multiplied in a ratio out of all proportion to the mere sum of the forces of its several parts. It would be able to defy attack, and would form a League of Peace capable of enforcing its will—so long as its will meant peace—upon the world.

But, though federation as regards matters of actual relations, and especially for defence, is at once the most important and the most pressing part of the Federal problem, it is not quite the whole of it. There are other lines along which the movement might travel, many matters calling for joint action, all helping towards the attainment of national unity. The exigencies of space forbid more than a bare mention of these elements of unity, but their mere mention will be sufficiently suggestive. Under the head of "Communications" much could be written. Some steps have been taken by the governments of the United Kingdom and of both the Colonies and Dependencies towards common action in Postal matters, that may lead, it is hoped, to far more uniformity than at present exists in this respect. Here, and, in another branch of communications, Telegraphs, the goal to be aimed at is the recognition of the Empire as a solid unit. Every step in this direction is a step towards political federation which must make itself useful in other branches of administration as well.

Law is a thorny subject; but it is one in which an enormous amount of advantage would be gained by more concerted action between the various parts of the Empire. The principle of this is already recognised by the passage of statutes having the effect of extending the legal processes of each part of the Empire to other parts, and generally providing for the recognition throughout the Empire of legal rights and obligations in whatever part of it originating. The discussions of the Imperial Conference of 1887, and of the conferences held among themselves by the Colonies of the Australasian group, show how great need exists for concerted action in this direction; and few things would exercise a more practically binding effect than the extended recognition of the unity of the Empire by further advances along this line. Business men as well as lawyers will see at once the work that has to be done here in bankruptcy and commercial law, and the execution of process in these branches and in criminal cases, copyright, trade-marks, etc.

The status of the Home and Colonial Civil Services and of the

learned professions and others, and the reciprocal recognition throughout the Empire of these ranks and diplomas, would also lend themselves to similar treatment. Emigration and colonisation are now subjects of great difficulty. The replies sent in by the Colonial Governments to the questions submitted to them, the report of the Colonisation Committee, which has just been issued, and the evidence of Agents-General and other witnesses, all show that, as things stand, the attitude of the colonies renders impossible any attempt by the Home Government to plant our surplus population on the vast tracts of land lying unoccupied in the Colonies.

The question of tariffs attracts much attention just at present; and some persons see in it the means by which Britannic Confederation can best be achieved. It is one of the subjects to be specially treated in a separate paper. It will be sufficient here to point out that, however desirable it may be to promote the intercourse of trade within the Empire, there are at present formidable obstacles in the way of attempts to do this, whichever direction such attempts take. If it be sought to establish an Imperial *Zollverein* with free trade within the Empire, there is the obstacle of the colonial tariffs, which are almost universally protective; and the colonists show no disposition to relax these tariffs, which, apart from protecting their young industries against the competition of the cheaper production of the mother-country, are by all of them presently regarded as necessarily the chief source of revenue in countries too young in the accumulation of wealth to stand heavy direct taxation. If, on the other hand, it be proposed to keep up in the Colonies a tariff-wall against the goods of the United Kingdom, only raising it somewhat higher against outsiders, this, on the one side, would not benefit the United Kingdom, while, on the other hand, it would involve the imposition of import duties against foreign countries by the United Kingdom; and these, to be of any use by way of giving a preference to the Colonies, must be on their chief productions, food-stuffs, and the raw material of manufactures, to increase the cost of which is a course that does not at present, in the absence of any substantial countervailing advantage, commend itself to the people of this country. Community of trade interests would undoubtedly be most valuable in cementing the bonds of national unity. But there are lines of less resistance along which the movement to that end can just now more safely proceed.

Before concluding this, perhaps, too lengthy paper, it seems fitting to make some reference to the work of the Imperial Federation League, to which is due in so large a measure the position which the colonial question now occupies in the politics of the day, and the great change that has come over the public mind upon the future of the imperial relationship within the past few years. Formed in 1884, at a Conference held in London, and presided over by the Right Hon. W. E. Forster, this League has now assumed almost the proportions of a national, or—though the two words ought really to mean the same thing when applied as they are here—imperial, organisation. The Conference laid down in its resolutions three fundamental propositions, which are as follows :—(1) That, in order to secure the permanent unity of the Empire some form of Federation is

essential; (2) that no scheme of Federation should interfere with the existing rights of local parliaments as regards local affairs; and (3) that any scheme of Imperial Federation should combine on an equitable basis the resources of the Empire for the maintenance of common interests, and adequately provide for an organised defence of common rights. These are broad and statesmanlike propositions, and they have withstood the fire of criticism—and the League has been subject to a pretty constant, if not always very heavy fire—during the seven years that have passed since they were adopted as the constitution and charter of the League.

The principal aim of the League hitherto has been to diffuse information and form public opinion on the subject of the colonial question both at home and in the Colonies. The measure of its attainment of these ends may be gauged by any one who will merely glance over files of newspapers and reviews for 1883 and 1884, and then for 1889–1890. To the action of the League, moreover, was directly due the convocation of the Imperial Conference of 1887, which, besides making a small beginning on the principle of common action in naval defence, though not quite on federal lines, was the means of showing how much required to be done in the way of common action, and how it might be done by discussions and action by Federal Councils at conferences.

In conclusion, it may, perhaps, be well to say that in this paper Federation for Defence has been given so outstanding a prominence for two reasons. First, it would have deserved and required such prominence in any case, because, in the opinion of the writer, it constitutes eight-tenths of the whole question of Federation. Secondly, it seemed to call for such treatment, especially in this introductory paper, because, though other branches of the subject are set down for separate treatment, no specific mention of "Defence" is made at all in the syllabus of papers to follow this one, and it would therefore have to be treated, it is presumed, under the general head of "Political." This seemed a sufficient reason for dwelling at length upon it here even to the partial exclusion of other topics.

In closing this article I must express my indebtedness to Mr. Robert Beadon—a member of the Executive Committee of the Imperial Federation League—without whose aid it could not, owing to other demands upon my attention, have been prepared in time for publication.

METHODS AND PROCESSES OF THE ORDNANCE SURVEY.

(*Read at a Meeting of the Society, Edinburgh, 19th March* 1891.)

By Colonel Sir Charles Wilson, K.C.B., K.C.M.G., F.R.S.,

Director-General of the Ordnance Survey.

The Cadastral, or, to use the more familiar name, the Ordnance Survey of the United Kingdom, is one of the most remarkable and complete works of the kind that has ever been undertaken; and it will always be regarded as one of the most valuable acts of practical government that has been carried out in this country. At the memorable Paris Exhibition of 1867 French experts classed the Cadastral Survey as "a work without precedent," and one that ought "to serve as a model for all civilised countries;" the British publication processes have been largely adopted by India, the Colonies, and foreign States; and a very high tribute was paid to the scientific accuracy of the Survey when the countries of the world intrusted the comparison of their national standards to Col. A. R. Clarke, C.B., F.R.S., one of its most distinguished officers.

The Survey had its origin in the military necessities of the troops quartered in the Highlands during the troubled period that followed Culloden. Roads had to be made for the passage of men and supplies; and, to facilitate their construction, General Watson, an Engineer officer then serving as D.Q.M.G. on the staff of the Duke of Cumberland, conceived the idea of making a topographical map of the Highlands. In this work he was assisted by William Roy, an Engineer officer of high scientific attainments, who measured the first base-line on Hounslow Heath, and gave the National Survey that military character which it has since maintained.

In 1791, just a century ago, a trigonometrical survey of the country was ordered for the purpose of producing a military map; and in 1797 it was decided to publish a general map of the kingdom, founded upon a minute survey. This map was on a scale of one inch to a mile, and the first sheet was published on the 1st January 1801.

In 1824 this survey was partially suspended, in order that Ireland might be surveyed on a scale of six inches to a mile, for a general land valuation. In 1840, the survey of Ireland being almost completed, and the 6-inch plans having proved to be of great practical value, H.M. Government decided to continue the survey of Great Britain on the 6-inch scale instead of on the 1-inch. This order continued in force until 1851, when there commenced a Parliamentary struggle, which has not inaptly been called the "Battle of the Scales." The battle lasted nearly twelve years, during which period one Royal Commission and three Select Committees of the House of Commons reported their views upon the scale most suitable for a national map. The 6-inch scale was stopped, and the 1-inch reverted to; then the 6-inch scale was ordered again. For fifteen months the Director-General had no orders as to

scale; in 1857 Parliament sanctioned the adoption of the 25-inch scale, and in the next year refused the money to carry it out. The Survey Department was disorganised, the public were dissatisfied, and a sum of £30,000 was absolutely wasted during the progress of the battle.

Finally, in 1863, it was definitely laid down that the undermentioned plans and maps were to be published :—

1. Town plans, on a scale of $\frac{1}{500}$, or 126·72 inches to a mile (commonly called the 10-foot scale), of all towns with more than 4000 inhabitants. On this scale 1 inch on the plan represents 500 inches on the ground.

2. Parish plans, on a scale of $\frac{1}{2500}$, or 25·344 inches to a mile (the 25-inch scale) of the cultivated ground in all counties. On the plans of this, the true Cadastral Survey, a square inch represents very nearly an acre, and the area of every parcel of land is computed and published either separately or on the plan itself.

3. County maps, on a scale of $\frac{1}{10560}$, or 6 inches to a mile; which show the form of the ground by contour lines at regular vertical intervals.

4. A topographical map, on a scale of $\frac{1}{63360}$, or 1 inch to a mile, in two forms : one in outline, with contours only; the other with the hill features.

5. Map of the United Kingdom, on the scale of 4 miles to the inch.

6. Map of the United Kingdom, on the scale of 10 miles to the inch.

Since 1863 the only changes of consequence that have taken place are :—The authorisation, in 1872, of a new 1-inch map of England and Wales, based upon the Cadastral Survey; the issue of authority to revise the maps of Great Britain in 1886; and the order, issued in 1887, to publish Ireland on the $\frac{1}{2500}$ scale. I may add here that we owe the Cadastral Survey very largely to the action taken by the Scottish M.P.'s in the Parliamentary Committees.

I do not propose, on the present occasion, to describe the measurement of the base-lines, and the operations connected with the principal triangulation and the levelling of the country. The trigonometrical operations involved an amount of privation and exposure which can hardly be appreciated by those who did not take part in them. Toilsome marches each day whilst station-hunting in the Highlands, and in the wilder districts of Ireland; weary watchings, sometimes for weeks, on the top of a high steeple or lofty mountain, waiting for the signal-flash from some far-distant station; complete isolation for months in a solitary camp on some rugged peak; snow-storms and furious gales, during which tents were blown down, and the safety of the great instruments endangered. Such were some of the experiences of officers and men. The rough life was not, however, without its charms; no one can read Drummond's graphic letters to his mother without feeling how much there was of interest, adventure, and romance in the work; and how well calculated it was to bring out the best qualities of the men employed upon it. The minute and watchful care bestowed upon the measurement of the bases and of the angles of the triangulation were well rewarded.

When 500 feet of the Irish base were re-measured, in presence of Sir John Herschel and Mr. Babbage, the difference between the old and the new measures was only one-third of the finest dot that could be made with the point of a needle. And when the base on Salisbury Plain was completed from the Loch Foyle base, through a network of triangles covering an intervening space of 360 miles, the computed length was found to differ from the measured length, of nearly 7 miles, by only 5 inches, a result which has well been called a triumph of geodesy. I regret to say that the scientific work of the Survey, which was at one time equal if not superior to that of Continental countries, has, in consequence of the pressure to complete the cadastral map, been for some years in abeyance. Nearly all other countries have re-measured the angles of their principal triangulation, and re-levelled their main lines of levels with the more perfect instruments of the present day. Great Britain should do the same. It is most desirable, in the interests of science, that the angles of the principal triangulation should be re-measured, and the main lines of levels re-levelled with improved instruments; that there should be new tidal observations, with the best self-registering instruments; that pendulums should be swung at selected stations; and that the differences of longitude between certain points should be determined with greater accuracy than they are at present. I hope that the scientific work may some day be resumed, but, as it is not necessary for the revision of the plans, I fear there will be much difficulty in obtaining the requisite money.

The 25-inch or Cadastral Survey of this country differs from similar surveys in foreign States, in that it is directly based upon the triangulation. The chain-surveyors work in the tertiary triangles, whose sides average $1\frac{1}{2}$ miles in length, and all details are fixed by rigid measurement with the chain; the limit of error allowed is two links in 1000, and all errors of survey in a triangle are strictly confined to that triangle. Errors cannot be entirely excluded, but, on the whole, the British Survey may claim to be the most mathematically accurate in Europe. All maps on smaller scales are reduced from the 25-inch map, which is called the "parent" map.

The field work of the Survey consists, at present, of the re-survey of Yorkshire, Lancashire, and Ireland, on the 25-inch scale, they having been originally surveyed on the 6-inch scale, only; the revision and re-survey of the towns in Ireland, and the two English counties; and the survey of new London. The next work to be taken up is the re-survey, on the 25-inch scale, of the six Scotch counties which were originally surveyed on the 6-inch scale, and this will be commenced during the course of the present year.

In carrying out the re-survey, the original 6-inch survey is largely utilised; the detail is plotted from the old field-books, and tracings of the outline are then made on tracing paper of a convenient size for examination in the field. On these traces buildings are outlined in red, streams and water in blue, other detail in black. The "Examiners" supply all new detail on the tracings, and obliterate that which is obsolete; they define roads as main, parish, or occupation; indicate

whether buildings are of masonry, iron, or wood, supply names, and test generally the correctness of the boundaries. A final examiner goes over the work of each party of examiners, and is responsible for its accuracy.

The trace supplied to the examiners is returned to the division office when completed; a draughtsman then transfers all the corrections to the plotted plan, and afterwards pens in all outline, colours the buildings and water, etc. All ornament, trees, furze, shingle, and rough pasture are stamped on the plans, and all names are typed. As the plans are reproduced by photography, the lines are made as black and sharp as possible. After the drawn plan has been thoroughly scrutinised by a "plan examiner," it is examined on the ground by the division officer.

The area of each enclosure is then computed and written down in a book of reference for examination at head-quarters. Each enclosure has a separate number, the numbers running consecutively through the parish. Up to this stage eight persons, who form mutual checks on each other, are employed on the production of one plan.

The plans are now sent to the levelling division for the insertion of bench marks and levels; and they are afterwards forwarded to head-quarters, Southampton, where they undergo a thorough scrutiny as to execution, agreement with the traces and other documents, and general conformity to Survey usage. The areas of the parcels are again computed and tested, and the plans are then returned to the division officer, with a list of remarks which may have arisen during their examination. On the return of the plans from the division, with the remarks attended to, the acreages are stamped underneath the parcel numbers, and the work is then forwarded for publication.

There is a wide difference between the practice of this country, in regard to the publication of large-scale plans, and that of foreign countries. In the United Kingdom the town and cadastral plans are published and sold at prices which are intended to cover the cost of publication. In foreign countries the plans are, as a rule, kept in MS., and copies, either tracings or lithographs, are supplied at the cost of the applicant; they are only published when necessary for special purposes, or to meet some particular demand. The publication of the English plans was authorised under the expectation that they would be largely utilised for administrative purposes, and by owners and occupiers of land; and that there would be no difficulty in selling out an edition, and so recouping the cost of publication.

Owing chiefly to the policy that has been adopted with regard to the sale of the maps, and to the ignorance of their existence in country districts, this expectation has not been fulfilled. In some cases sheets have run to two and three editions, but in a very large number of instances only two or three impressions out of an edition have been sold. The labour entailed by the publication of these large-scale plans has been enormous, and very much beyond anything that the Survey departments of other countries have been called upon to undertake. Their production and publication have been the real work of the Ordnance Survey Department during the last thirty years, rather than the production of maps on smaller scales.

Up to 1853, all Ordnance Survey maps were engraved on copper; but, in 1854, lithography was adopted for the $\frac{1}{500}$ and $\frac{1}{2500}$ scales. This was soon displaced by zincography, which has in turn, since 1889, given place to photo-zincography. The art of printing a line-photograph in permanent ink from a zinc plate, or photo-zincography, was discovered in 1859, but excepting for the reproduction of national MS., no practical use was made of the discovery until 1881, when the process superseded engraving for the production of the 6-inch map. To obtain the full advantages of the process, the MS. $\frac{1}{2500}$ plans were drawn in a style suitable for reduction, *i.e.* the buildings were coloured yellow to reproduce black, and the names, ornament, numerals, etc., were exaggerated so that their reduction might be of the proper size. This arrangement had its disadvantages. The $\frac{1}{2500}$, or parent map, still continued to be published by zincography, and was really sacrificed to its offspring, the 6-inch map, which was published months in advance of its parent. It also ruined the drawing, which was formerly so much admired, for the draughtsmen, realising that their efforts were only directed to the preparation of a groundwork for a mechanically-reduced map, lost interest in their work. In Ireland, however, where photo-zincography has never been introduced, the MS. plans continued to be very beautiful works of art. Photo-zincography has now been adopted for the publication of all new plans on the $\frac{1}{500}$ and $\frac{1}{2500}$ scales, with the following advantages:—Fidelity of reproduction of the original; saving of cost in the case of close work; acceleration of publication; uniformity of execution; great improvement in the style of original drawing; and facility in revising town plans. The parent plan has also resumed its proper place in the publication in advance of the 6-inch map.

The photo-zinco process is so well known that I need not describe it here, except to point out the large scale upon which photo-copying is being carried out by the Ordnance Survey Department. The $\frac{1}{2500}$ plans are photographed their full size of 38·016 inches by 25·344 inches; and the glass plates measure 45″ × 30″, and weigh 33 lbs. The paper used for the photo-transfers is Evans' thin paper; and it might be thought that a system of photographic reproduction, based on a flimsy paper transfer, would introduce many elements of inaccuracy. In practice, however, the process is found to compare favourably, as regards accuracy, with zinc etching methods, and engraving on stone or copper. Impressions varying more than one-sixth per cent. from the true scale are now cancelled. This result is very largely due to the skill that has been acquired by the photographic and printing staff.

The following method has recently been adopted for producing the $\frac{1}{2500}$ plans of large towns from the $\frac{1}{500}$ plans:—A convenient number of $\frac{1}{500}$ plans are pinned together, and a negative of the reduction obtained in the usual way. From this negative a cyanotype print is obtained, the result being a pale blue image on a white ground. The necessary drawing is now proceeded with on the cyanotype, and, when complete, it is fixed in its proper position with the surrounding $\frac{1}{2500}$ detail, and then re-photographed for publication.

The maps are now printed by a specially designed steam zinc-plate

printing machine, which, when necessary, can print 900 impressions an hour.

THE 6-INCH SCALE.—Until 1881, the 6-inch map was engraved on copper, the reduced detail being obtained from the $\frac{1}{2500}$ map by photography. In 1881 it was decided to abandon engraving in favour of photo-zincography, and the practice was to pin four $\frac{1}{2500}$ sheets together with their proper margin, and reduce them at once to a quarter sheet.

The present system is to take a blue impression of each $\frac{1}{2500}$ sheet as it is being printed for publication, and upon this to pen in to scale all detail that is to appear on the 6-inch map, in black, whilst the names, ornament, trees, numerals, etc., are typed in an exaggerated style, so as to be of suitable size when reduced. All parcel and area numbers and unimportant detail are not penned in, and, being in blue, do not photograph. Four such plans, forming a 6-inch quarter sheet, are placed together and reduced at once by photography. The parks, mud, and sand are inserted in a tint by transfer from copper after the photo-transfer has been laid down on zinc.

The 6-inch quarter sheet was adopted partly for convenience, the size being much more handy than that of the full-sheet, and partly for acceleration of publication, for a quarter sheet can be published as soon as the four component $\frac{1}{2500}$ plans are received, without waiting for the other twelve.

It may be mentioned that, as an experiment, sixteen $\frac{1}{2500}$ plans were placed in position on a screen with the proper margins, and a full 6-inch sheet produced from them in one operation. There was a slight distortion towards the corners, but I believe this may eventually be overcome.

THE 1-INCH MAP.—The MS. map on the scale of 1 inch to a mile is produced from the 6-inch maps by the aid of photography. The 6-inch map is printed in light-blue ink, and the detail that is to appear on the 1-inch map is then penned in with black ink. By this means only the details in black appear on the reduced photograph which is used by the engraver. This reduction also gives the index map to the $\frac{1}{2500}$ sheets in a 6-inch sheet, which, by the use of stencil plates, we are able to sell coloured for 2d.

One of the most troublesome details we have to deal with in producing the 1-inch map is the selection of the names and artificial features that are to appear on the smaller scale. In the old 1-inch map this difficulty did not occur, for the survey was made on the 1-inch or 2-inch scale, and the surveyors only showed those features that could properly be represented on that scale. The old 1-inch was also a military map, and details not of military importance were omitted. The new 1-inch map is produced by a more or less mechanical reduction from the 25-inch plans, by men who have no personal knowledge of the details on the ground. This led at first to the occasional omission of detail, such as clumps of trees, which though very prominent on the ground did not

appear to be so on the large-scale map. To meet this difficulty, prints from the reduced photographs are now examined on the ground by highly trained men, who eliminate unimportant detail, and add important features that have accidentally been omitted during the process of reduction. The prints are also examined, in a more general manner, on the ground, by an officer, and the names that are to appear on the 1-inch map are also checked by an officer.

In this manner we try to ensure accuracy, and avoid overcrowding of detail and names; and I think the sheets that have been published during the last year will bear comparison with the maps of any country. It must be remembered in comparing the English 1-inch map with the maps of other countries, that whilst the latter, on scales analogous to the one inch, are military maps, the military character of the 1-inch map has had to give way to the civil requirements of the State. There is, too, no country in the world which is so covered with artificial features, houses, roads, railroads, etc., as England; and the representation of even a selection of these must overcrowd a map on a small scale. There are, it may be remarked, quite as many complaints of omissions as of overcrowding, and features which some people consider to largely enhance the value of the map are denounced by others as useless and disfiguring.

The old system of engraving the 1-inch map was in the first place to engrave all the outline and writing upon a plate of mercantile copper. A matrix was then taken by the electrotype process, and from this a duplicate copper-plate was made, upon which the contours were engraved. This plate was used for printing the copies sold in outline, without the hill features. The hill features were afterwards added to the original plate. This system had one great disadvantage, that whenever a new railroad or road was inserted on the plate, the hills were damaged, and had to be repaired at great cost, but it had the advantage of requiring only a single printing. The introduction of the steam copperplate press has enabled us to bring the present system into use. All the outline, including the contours, is now engraved on one plate, and the hills on another; and the hill impressions are produced by double printing. The hill plate will now never require repairing, and will always preserve the character given to it by the original engraver. It is also possible to print the hills in any colour.

The electrotype process is used to produce duplicates or facsimiles of the engraved plates, which show signs of wearing after 700 or 800 impressions have been printed. The electric current was formerly obtained from voltaic cells of Smee's pattern; but these have been replaced by a dynamo driven direct by a Willans high-speed engine. The system of steeling the surface of the plates is also now used.

Line-engraving is a very slow process, and it is difficult to find engravers with sufficient skill and artistic taste to engrave the hill features on the 1-inch map. We have, therefore, for the last two years, been trying to discover some more rapid process, and one that should combine on the same map the mathematical accuracy of the contours, with the pictorial effect of hill-shading. We have, unfortunately, only been successful to a certain extent, but the difficulty seems to have been overcome by a

German publisher, Herr Petters, who has produced a very good result from one of the brush-drawings of the 1-inch map.

The processes of the survey were described in great detail, in a series of papers communicated to *Engineering* in 1888 by Captain Sankey, to which I would refer those who are interested in them. A very good general account, of which I have largely availed myself, is contained in a lecture given by Major Washington, R.E., at the School of Military Engineering, Chatham.

There are some points connected with the survey to which I should wish to draw attention.

The revision of the Survey has unfortunately fallen very much in arrear; so much so, in fact, that in many places revision means a re-survey. The necessity for a revision has frequently been pointed out by the officers who have had charge of the Survey; but it was not authorised until December 1886. The question of revision is purely one of money. It is, I think, hardly possible for the Survey Department, with its present staff, to overtake the heavy arrears, and get the map of the country into a normal state; but those arrears once cleared off, it would be a simple matter to revise the country once every fifteen years, and town districts oftener.

In view of a periodical revision, I have roughly divided the kingdom into revision districts, and as opportunity offers I am moving the division officers into centres, which will probably be permanent. Thus, the division officer at Edinburgh will, as the revision of Scotland progresses, be responsible that the revised plans are afterwards kept fairly up to date. I propose to invite the surveyors of the large towns to place themselves in communication with the division officer, and to inform him annually of extensive improvements or additions. These would be surveyed every two or three years, and transferred to the large negatives which are kept at Southampton. In this manner the plans of the large towns will be kept well up to date. The plan that I am adopting will allow no new work to fall into arrear; the time when old arrears will be cleared off depends entirely on the annual grant to the Survey.

In the utilisation of the Ordnance Survey maps the Irish Government is quite twenty-five if not fifty years in advance of Great Britain. In Ireland townland boundaries and areas, as ascertained and shown upon the Ordnance Survey maps, are the legal boundaries and areas of the townlands, and they can only be altered with the sanction of the Lord Lieutenant and Privy Council of Ireland. As there are rather more than 62,000 townlands in Ireland, averaging a little over 300 acres each, it will be seen that that country contains a large number of small, practicable, and well-defined units, from which all other divisions, such as parishes, baronies, counties, unions, and electoral divisions can be built up. Disputes as to townland boundaries are unknown. It may be added that no private boundaries are shown on the plans; the Ordnance Survey only deals with administrative boundaries.

The Irish Valuation Acts provide that the Ordnance Survey maps are to be used in ascertaining the areas of tenements, and a very good system of valuation is in force. The cost of the original tenement

valuation was $3\frac{3}{4}$d. per acre, or £10 a square mile, and this included the marking of the tenement boundaries on the Ordnance maps; the computation of the areas; the valuation of the land, buildings and all other property; the settlement of appeals; and the issue of final lists for rating purposes. The time occupied in each county from the commencement of the valuation to the issue of the valuation list was about two years.

In Ireland, too, the maps are used in all transactions affecting land under the various Land Acts; and it may be said that, as the great "Down" survey was made the instrument for conveying to the adventurers and soldiers of Cromwell's army lands taken from the old Celtic owners, so the Ordnance Survey has become the instrument for conveying the same lands to the tenant descendants of those owners who have been enabled to purchase their holdings by recent Land Acts.

In Great Britain the case is very different. The boundaries and areas on the Ordnance Survey maps are not legal, and the maps are very rarely used for local assessment or administrative purposes. The nation deliberately undertook this elaborate Survey, on the ground that no private enterprise could accomplish it satisfactorily; and now, after spending millions on its production, the country hesitates to make use of the maps in the manner intended by the able statesmen and scientific men upon whose recommendation it was authorised by the Government of the day.

It is hardly necessary to refer to the errors, irregularities, and inconsistencies of the valuation for local assessment in this country, and to the erroneous areas in the rate-books. The areas of some parishes in the Poor Law Return of 1882 are as much as from 400 to 1600 acres less than the true areas ascertained by the Survey. In one parish an owner is rated for 40 acres more than he possesses, and another owner for 84 acres less. The valuation list, directed by Section XIV. of 25 and 26 Vict. cap. 103, to be made by overseers of parishes, does not refer to the Ordnance Survey or its maps; and it may be said that, as a rule, the guardians, overseers, and rate collectors act as if there were no such maps in existence as those of the Survey.

The Ordnance Survey maps on smaller scales might also be used advantageously as the basis for the preparation of statistical maps.

The price at which the Ordnance Survey maps are sold has been much criticised, and has been compared unfavourably with the prices of foreign maps. This question is a somewhat complicated one; and it is not easy to institute a fair comparison between the selling prices of English and foreign maps. For instance, in England the map-agent receives $33\frac{1}{3}$ per cent. for handing the maps over the counter; that is, for every 1-inch impression sold, the agent receives fourpence of the shilling paid by the public; for every three-shilling 25-inch map he receives one shilling. He receives also $33\frac{1}{3}$ per cent. on the cost of colouring. Thus, if a town plan costs ten shillings to colour, five shillings has to be added to this for the agent. This, in itself, is a heavy tax on the English maps; and, it may be added, that the paper on which the English maps are printed is much superior to that used abroad. As

regards the actual cost of production, I believe England can compare favourably with foreign countries.

Since the 1st January 1885 the sale of Ordnance Survey maps has been entrusted to the Stationery Office. The Director-General of the Survey carries out the survey and the manufacture of the maps, and there his functions and responsibilities cease. As regards the disposal of the maps, he supplies the Stationery Office with such maps as it requires for sale, all arrangements for sale resting with that department.

We are, as I have said, about to commence the revision of Scotland, and there is one point connected with it which I am glad to have this opportunity of bringing to the notice of the Royal Scottish Geographical Society. I allude to a revision of the place-names,—a work in which, I hope, we may have the co-operation of this Society. Very great care was originally taken in the collection of the names, three authorities were obtained for each name, and the orthography was determined by men with a good knowledge of Gaelic. I am afraid, however, that there was too great an inclination to attribute a Gaelic origin to all names, and that in some places, more especially on the West Coast, the Ordnance Survey orthography is sometimes at fault. The following notes on the subject have been given to me by Lieut.-Colonel J. Farquharson, C.B., R.E., the Executive Officer of the Survey, who had very wide and varied experience during the survey of the Highlands and of the Western Islands.

Place-Names of Scotland.

1. In the south-eastern counties the place-names are not materially different from those in the north-eastern counties of England—*i.e.* they are probably in the main Anglo-Saxon or Frisian, with minor mixtures of Norse and Celtic.
2. In the south-western counties of Dumfries, Kirkcudbright, and Wigtown, there is a stronger element of Norse (Icelandic or Norwegian) in common with the adjoining English county of Cumberland, where nearly all the names are of Norwegian origin. This Norse element diminishes northward through Ayr to Dumbarton and Stirling.
3. North of Stirling and the Firth of Forth, in the eastern counties, the majority of the names are probably of Celtic origin, in the interior of the country entirely so, but along the eastern coast there is a sprinkling of Norse names.
4. In all the above-mentioned districts the names have been so much corrupted that their original form and their meaning are, and probably always will be, in many cases conjectural. The Norse names are more easily recognised than the other. There is not, as in Ireland, an ancient literature in which many names are recorded in their original forms; and in Ireland also it may, in nearly every case, be assumed that the names, except those applied within a recent period, are Celtic in origin. In the above-mentioned Scottish counties there has been a much

greater mixture or succession of races, with the result that there is greater uncertainty as to the language to which the name may have originally belonged. Until, therefore, the more northern counties are reached, any amount of labour bestowed on endeavouring to trace the origin or meaning of the place-names of Scotland would hardly give any satisfactory result. The only exception might perhaps be in the case of the three south-western counties named above, where such manifestly Norse names as Wigtown, Fleet, Tinwald—(I think there is a place of that name in Dumfriesshire)—Lockerbie, Gretna, Langholm, etc., might be easily enough picked out.

5. From the Firth of Clyde northward through the western counties to Sutherland, the names on the mainland are in the interior purely and manifestly Celtic, and along the coast mainly Norse or Icelandic. Many of the Celtic names of minor features are descriptions of the feature, *i.e.* the name consists of more than one Gaelic word. In such cases the name has been written in as pure Gaelic as possible on the Ordnance Survey plans. This probably is more consistent, and pleases the eye better than would have been the case if English or phonetic corruptions of the names had been written; but the result must often be very puzzling to people who are ignorant of Gaelic. For instance, Beinn Fhada (Long Hill) is a well-known mountain in the south of Ross-shire, and appears on all the old maps, as it is in fact pronounced, Ben Attow. Sgùrr Fhuaran, another prominent mountain near it, is pronounced Scour Ouran, and so on. In all the old maps, whether of the whole country or of separate counties or localities, the phonetic method of spelling was used, and in the case of villages, farms, or houses, of course the recognised, and not the purely Gaelic form, has been adopted for the name by the Ordnance Survey also.

6 In the case of the Norse names which prevail along the western coasts and islands, and in the counties of Sutherland and Caithness, great difficulty arose as to the proper mode of spelling. All the local authorities, or nearly all, were in favour of spelling the names in the Gaelic fashion. The best illustrations of this are the two Norse words largely used as terminals of names—Vagr or Vogr, a bay, corrupted into the (pronounced) form -vaig, or -vay, or -way; and Fell or Fjall, a mountain, corrupted into the (pronounced) form -val. There is no *v* and no *y* in Gaelic, and no *k*. Therefore the question was should Fiskavaig (Fish Bay) be written as pronounced, or in its Gaelic form Fiscabhaig? Should Stornoway be written as pronounced, or in its Gaelic form of Steornabhaigh, where *bh* represents *v*, and *gh* represents *y*? Should Roneval be written as pronounced, or in its Gaelic forms of Ronebhal, as written to all mountains (*bh* for *v*) in the Lewis survey, or Ronemhal (*mh* for *v*) as generally written in other districts?

7. There is another difficulty, namely, that the persons who collected

the names on the ground, or those who were the local authorities supplying the names to the Ordnance Surveyors, were, if enthusiasts for all names being given as Celtic or derived from Celtic words, under great temptation to supply Celtic meanings and forms where they were or should have been manifestly ill-founded. Thus, I think, nearly all the names of the most prominent mountains in the island of Rum were originally shown (taking Haskeval as a specimen) in some such form as Aisgemheall. Here the Norse *Fjall, Fell,* or *Val,* has been turned into the purely Gaelic word *Meal* = a lump or eminence (of which *Mheall* is an inflexion, the *mh* being = *v* in pronunciation). And no doubt some meaning has been found, or at any rate has been endeavoured to be found, for the prefix Aisge.

If this had been done to a large extent, and I think it has been done to some extent, the place-names of these districts would have been quite misleading. There are several words used in place-names which are similar to each other in Norse and in Gaelic, but which are entirely different in meaning, and which are liable to get mixed up in the above way. For instance, the Norse terminal word -bol, "a farmstead," becomes in Gaelic pronunciation -pol ; and if there is anywhere near the place a pool or lake it always is spelt -poll (Gaelic for pool), and assumed to take its name from the lake, although this is by no means always the case. In the island of Tiree there is a loch called Loch Vassapol. The "Vassapol" has evidently been originally "Vatns-bol" = the farm on the lake (Vatn = the Cumberland "water," as in Derwentwater, etc. = a lake). The farm name has disappeared, and the loch is now given the name Loch "Bhasapoll."

It seems probable, therefore, that the principal questions as to the place-names of Scotland which could be decided with comparative ease are only two in number, namely, the two questions upon which I should be glad to have the opinion of this Society :—

(1) Whether names admitted to be Gaelic should be spelt phonetically with English letters ; or, when they apply to natural features, in the manner in which they now appear on the six-inch map, with Gaelic letters and grammatically in Gaelic ?

(2) Whether in the case of the coast and island names there should not be a thorough revision to distinguish more clearly the Icelandic and Norwegian names from the Celtic ?

I would also ask whether this Society could not, either by the appointment of a small committee of Gaelic and Norse scholars act as referees, or in some other manner co-operate in the revision of the place-names. Of course the ultimate decision with regard to the orthography must rest with the Director-General of the Survey ; but I am personally most anxious, and I feel sure my successors will be so also, to obtain the advice and assistance of those best qualified to pass an opinion on the subject.

STATICAL OCEANOGRAPHY—A REVIEW.

By Hugh Robert Mill, D.Sc., F.R.S.E.

The task of writing the first book in any department of science is a serious one, not to be lightly undertaken. Masses of original data which have been accumulated from many sources must be sought out, sorted, and valued. They must be assimilated and elaborated so as to build up a natural system, organised by general laws deduced from many particular cases. A great gulf separates the memoirs of a specialist from a formal treatise on any branch of science. Only second in difficulty to constructing a pioneer work is the authorship of an independent book in a language not hitherto directed to the expression of a particular group of facts, for although similar works already exist in other languages, translations are rarely satisfactory, and adaptations are always clumsy. Professor Thoulet in preparing his treatise on Oceanography [1] was unaided and unembarrassed by any earlier works in French. Indeed the only recent oceanographical books have been produced in Germany, where Boguslawski, Krummel and others had made themselves masters of the subject. In English, even, there are no formal statements of results, although most of the accurate data which make oceanography a science have been obtained by British and American workers, and our language is rich in original researches whence the corner-stones of all future treatises must be quarried.

M. Thoulet fully recognises the difficulties with which he has to contend, and sets about the work not only with the scientific enthusiasm common to his countrymen, but with a frank avowal of his shortcomings and a generous appreciation of the labours of foreign workers which command the highest respect. The important nature of the book justifies a somewhat detailed review in this *Magazine*, from which many of the data for it were taken with due acknowledgment. What has to be said in the way of criticism is meant to be constructive, not destructive: we aim at fault-mending rather than fault-finding.

The volume originated in a course of lectures delivered to naval officers, and first appeared in the columns of the *Revue Maritime et Coloniale*. Its subject-matter is partly derived from the author's original work, and partly from official visits paid to Norway, Scotland, and Switzerland in order to report on the methods of marine and lacustrine research carried on in those countries. This origin accounts for the compilation being a little scrappy and varying in the degree of detail; although, as the author rightly points out, the facts themselves are not yet equally firmly established in all cases. The division into parts, chapters, sections, etc., is difficult to understand, and becomes confusing when subsequent reference has to be made to any passage. A uniform sub-division into consecutively-numbered chapters and paragraphs would be a great advantage. The illustrations are of indifferent merit, although most of them are serviceable. We cannot understand the absence of maps or of an explanation of the

[1] *Océanographie* (*Statique*) par M. J. Thoulet, Professeur à la Faculté des Sciences de Nancy. Paris: Librairie Militaire de L. Baudoin et Cie., 1890, pp. 492. Price, 10 fr.

omission. If the author had kept before him a set of good bathymetrical, temperature, and salinity charts of the oceans, we think that many of the descriptions would have been far more effective, and that he would have been able to take a wider view of general distributions. Indeed the worst fault we have to find, and this we can scarcely mend, is that too much space is given to the description of methods, and too little to the statement and explanation of the results obtained by means of them. How far equilibrium may be restored by the volume on dynamic oceanography, which the title seems to promise, we cannot say, for the distinction between the static and dynamic parts of such a science is very hard to draw. We regret that M. Thoulet had not the courage to introduce the euphonious and descriptive term *Thalassology*, which he recognises as more in harmony with the genius of the French language, especially since in the form of *Talassografia* it already adorns Italian, and has been adopted in English by Agassiz as *Thalessography*. This backwardness in the adoption of new words is unfortunately too prominent in all departments of scientific geography. French, and still more English, writers are constrained to use awkward periphrases on account of their unwillingness to create terms; in the end they too frequently adopt expressions hammered out of definite shape by use with many meanings, while their German contemporaries, rejoicing in the freedom of a boundless language, make a simple and expressive name for each new fact and idea.

It is time to consider our author's definition of the science for which, bowing to the majority, he has retained the name of Oceanography, and to glance at the way in which he has co-ordinated the facts suggesting it:—

"Oceanography is the science of the ocean; it comprises all the laws applicable to the sea, not only in the domain of chemistry and physics, but also in those of mathematics, mechanics, and astronomy. Oceanography concerns itself with understanding and explaining the form of submarine relief, the nature, mode of deposition and induration of the sediment accumulating in the depths, the chemical composition of the water, the distribution of heat, of salinity and density, the different gases and dissolved solids, the currents which furrow the surface and the ice which covers some parts."

This is comprehensive and satisfactory; but we cannot agree with the statement which follows, that "Oceanography is not physical geography even restricted to the sea." We believe that oceanography is a department of physical geography, because we deny that physical geography is, as M. Thoulet suggests, concerned with the earth only as the theatre of human history. While geography in its widest sense has as its aim the ultimate relations of the earth to man, the department of *physical* geography is set apart as a description of the earth in its natural conditions with no more special reference to man than to any of the other mammalia.

A brief historical summary in the Introduction might be advantageously extended and carried back at least to the time of Boyle and Hooke, who devised many valuable and ingenious pieces of apparatus for marine research. It is scarcely surprising to find Sir John Ross confounded with Sir James Clark Ross; but an error in enumerating the *Challenger* staff (p. 15) should be corrected: Captain Tizard was a naval

officer, not on the scientific civilian staff, to which the name of Professor Moseley ought to be added. The statement that the days of *Challenger* and *Gazelle* expeditions are past needs a word of explanation. We fully realise the importance of detailed work in small areas, such as that of the Norwegian North Sea Expedition, the United States Fish Commission, the Kiel Commission, the Scottish Marine Station, and the Fishery Board for Scotland, the last of which is not referred to. But an expedition on the *Challenger* scale is still required to clear up many problems connected with the Pacific, unless we are content to wait until the Hawaiians, Samoans, and Fijians commence explorations on their own account. Antarctic research also, if it is to be successful, must be carried out on a large scale, and with well-equipped vessels.

A good *résumé* of the geological changes of the ocean, the influence of earthquakes, and the gravitational distortion of sea-level, leads up to a particularly interesting and able statement of the methods of deep-sea sounding. Most of the apparatus is well figured, but the sketches of the Prince of Monaco's sounding-rod are unsatisfactory, from the want of reference-letters to the various parts described. As a striking instance of the improvement in quick sounding, it is mentioned that Sigsbee's piano-wire sounding machine required 29 m. 45 s. for the lead to descend to 2900 fathoms, and 34 m. 35 s. to heave in; while the *Challenger's* hemp line took 33 m. 35 s. to sink to 2400 fathoms, and required 2 h. 2 m. to draw up again.

The Ocean Basins might possibly have received fuller treatment, but the descriptions are well up to date, and include an abstract of Dr. John Murray's calculations of volume and depth translated into metric units. In describing the continental shelf (p. 109), it is a mistake to say that New Zealand, Madagascar, and the Antilles are brought in touch with their nearest continents by means of it; as all these islands are separated by water much more than 100 fathoms deep.

The description of deep-sea deposits and their analysis is full and interesting; but more might have been said regarding the use of the microscope, and a notice of the ingenious process devised by Mr. Pearcey, of the *Challenger* Office, for hardening and cutting sections of muds and oozes would be of value. In mentioning the occurrence of shark's teeth and whale's ear-bones in the Red Clay, the author reveals a strain of humour:—"Might not one explain the abundance of these remains, far from land, by the instinct which impels all the higher animals, on feeling the approach of death, to flee to the most distant places?"

"Marine Chemistry" is a title which demands three divisions each of several chapters, or sections, or paragraphs to exhaust; and in its consideration we again find great detail in the description of methods, and far too little generalisation, or even statement of conclusions. The methods, although usually more amply treated than the general reader requires, are rarely detailed enough to enable a worker to dispense with the original papers referred to. The historical account of water-bottles for collecting samples below the surface could be made more complete.[1]

[1] See, for example, *Proc. Roy. Soc.*, xiii. 539.

Mill's water-bottle is described and figured in a transition form, now discarded for an arrangement by which the sample of water is automatically locked into the enclosing cylinder when the bottle is shut. In the description of sea-water analyses, Gibson's exceptionally fine work for the Fishery Board for Scotland should be mentioned; and in order to be complete, Dittmar's discussion of Buchanan's method for determining carbonic acid ought to find a place. None of the chemical methods described is more simple or beautiful than M. Thoulet's own process of estimating the suspended matter in sea-water by filtering a little of the liquid through a porous porcelain disc under pressure, and determining by ignition the proportion of organic and inorganic sediment. The importance of such a quick, cleanly, and accurate method, can only be realised by those who have been driven to despair by many filter-papers. Speculations on the solution and precipitation of solids in sea-water (p. 269), would be more intelligible if M. Thoulet had given an abstract of his experiments on the subject, which is one of much importance and great difficulty.

In reading the history of marine thermometry, we are struck with the small place given to the magnificent work of Saussure and Aimé, and still more by the inadequate description of modern instrumental methods. On p. 286 a Miller-Casella thermometer is figured, with a serious error in drawing the protecting bulb, which vitiates the description. No notice is taken of Tait's study of the pressure correction of these thermometers, nor of Buchanan's ingenious use of the piezometer to check their readings at different depth when the temperature varies unequally. The accuracy of the instruments is also under-estimated, as Buchanan's improvements have made them capable of being read easily to a much smaller fraction than the half-degree (C.?) which is here assigned. The uncertainty of the Magnaghi frame for reversing Negretti and Zambra's deep-sea thermometer is not referred to, and although the Scottish frame is described and figured, its prototype, invented by Rung, is passed over in silence. In speaking of self-registering instruments, the author, curiously, does not refer to Richard's thermometers. The tables of specific heat for sea-water, deduced from M. Thoulet's own experiments, are of much value; but in describing the work done in determining the coefficient of dilatation, he should not have omitted the important results of Dittmar, published in the *Challenger* reports.

The study of deep lakes, we are told in a particularly happy expression, affords information intermediate between that drawn from laboratory experiments and actual observations in the open ocean. On this account M. Thoulet rightly devotes a good deal of space to lacustrine conditions, based mainly on the admirable work of Forel and others in Switzerland. Full and deeply interesting as the account is, it might be extended, and the conclusions perhaps modified by taking account of the work of Aitken, Buchanan, Murray, and others on the deep lakes of Scotland, where the practical importance of the maximum density point has been shown to be much overrated, and the influence of wind has come into prominence.

When M. Thoulet criticises "Boguslawski's Laws"—which are

simply a formal statement of the *Challenger's* temperature results—we disagree with his interpretation of observations. It has been generally conceded by physical geographers that there is evidence to establish the greater volume of the surface currents from the Equator poleward than in the opposite directions. And it is believed that there is direct evidence for the necessary inference that a slow mass-movement throughout the whole depth of the ocean takes place from the Polar regions toward the Equator, chilling the bottom-water in all the oceans. This postulates vertical as well as horizontal circulation in the oceans; and by the researches and observations of Murray and Buchanan the old theory of the dependence of surface circulation on the winds has been confirmed and extended so as to explain movement at all depths. M. Thoulet, in opposition to other oceanographers, asserts that it is impossible to believe that zeolites and manganese nodules could form in the Red Clay unless the oceanic depths were absolutely stagnant. He fails to recognise any force adequate to produce vertical circulation (p. 318) in the basins, shut off from each other by sills which form the floors of the oceans; but in another place (p. 368) he gives an interesting figure to demonstrate how change of surface density alone can give rise to complete vertical circulation in a deep basin. We cannot deny his hypothesis that the low temperature of the deepest ocean may be due to the unabated legacy of cold left by the Glacial Period, but surely the suggestion is very far-fetched. The arguments which to us appear conclusive against M. Thoulet's theory of oceanic stagnation are briefly these. The basins and sills of the ocean-floor are in almost all cases very gentle hollows and very gradual rises; and wherever the sills or bars are at all abrupt or continuous the mass-movement of the ocean is stopped, as, for example, by the Wyville-Thomson Ridge and in deep enclosed seas. Again, if the ocean had been stagnant since the Glacial Period, the dissolved oxygen would long ere now have been absorbed by the creatures which live, or at least decay, at all depths; but the *Challenger* investigations failed to find any samples of water free from dissolved oxygen, which must have been absorbed at the surface. Crystals form readily in evaporating dishes, in which convection currents due to evaporation keep up slow circulation, and there seems no reason to believe that the very slow movement on the bed of the ocean would put a stop to the chemical processes going on there. M. Thoulet refers to the *Challenger* temperature data as competent to throw light on the matter, but does not attempt their discussion. When the official Report on Oceanic Circulation is published we believe that it will entirely substantiate the views of the physical geographers of Britain and Germany. It may be that we are unjust to M. Thoulet in interpreting his statements so rigidly as we do; the whole subject of oceanic circulation belongs properly to the dynamic rather than the static aspect of oceanography, and is thus probably reserved for exhaustive treatment in a future volume.

The treatment of Specific Gravity is of much interest, and keeps alive several questions which have not yet advanced beyond the stage of discussion. It is carefully pointed out that the relation of specific gravity to salinity is dependent on the temperature at the time of observation,

and on the chemical composition of the dissolved salts. On this account M. Thoulet is inclined to assign little value to a determination of specific gravity as a measure of salinity, preferring a complete chemical analysis of each sample for that purpose. Here we venture to think that convenience and speed of working turn the balance in the opposite direction. By the use of tables of thermal dilatation, which certainly are to some extent empirical, we can roughly determine the general distribution of salinity over a very large area from numerous hydrometer observations, leaving the laborious and costly complete chemical analysis to fix the exact composition of a few typical samples. Such an expedition as that of the *Challenger* would have left the maps of surface salinity almost as blank as before unless numerous hydrometer readings had been taken, and their indications utilised. The rough results obtained are of the same order of utility as the route-maps of the first traveller over a new country, being invaluable until better are forthcoming. M. Thoulet seems to mistake the purpose of the *Challenger* specific gravity maps, and the value of reduction to a standard temperature. He says on page 352 :

"The specific gravities of the ocean surface during the cruise of the *Challenger* for summer and winter throughout three years are all entered on the same sheet ; while it is evident that the density at one point, being a function of temperature, varies according to the season, that is to say continually, and that it is not comparable with the density taken at another point, even near, and at a different period. To be truly useful, a map of this kind should be constructed for one month only."

It is probably because the data are so scanty that monthly maps of salinity are not given, and in order to reduce the obvious disadvantage to a minimum all the *Challenger* observations were reduced to their value at 60° F. To this M. Thoulet objects very strongly :—

"Even supposing that the densities are observed simultaneously over the whole globe, since we wish to discover the causes and the laws of a variable, we must not make this variable as constant as possible, that is to say, suppress the variation. A map should express the results of observation, as they really exist ; and when it is treated as described above, it represents the thing that is not, and that never can be, for it shows a condition of immobility, when the problem is on the contrary to represent and to study movement."

The same argument, it seems to us, would debar the meteorologist from reducing the pressure of the atmosphere to sea-level, and the chemist from calculating the results of a gas-analysis at a standard temperature and pressure. The variable in the *Challenger* map referred to is not density, but density at constant temperature, or salinity ; and we cannot see how the hydrometer readings could be better employed. Failure to perceive that the results aimed at in such representations are essentially static and not dynamic, leads M. Thoulet to object still more strongly to the *Challenger* salinity sections, showing the distribution of density at constant temperature and pressure at all depths. If the effect of pressure and temperature be allowed for in drawing the curves, as in the specimen section which he gives, the variable salinity is entirely masked by the effects of constant fall of temperature and rise of pressure with increasing depth. True, in the dynamic part of the *Challenger* discussion, which is

not yet published, such sections as appear in vol. I. of the *Physics and Chemistry* would be of no use; and we may be sure that, when oceanic circulation is being discussed, care will be taken to use only such data as are applicable, and in the manner best adapted to bring out correct conclusions.

The effect of pressure on sea-water, the action of water on light, and the colours of different seas are treated in a satisfactory way; and a brief sketch is given of the methods of marine biological collecting and the distribution of deep-sea fauna. The volume concludes with a graphic account of sea-ice which might well be supplemented by reference to Buchanan's valuable experiments on the freezing of brines. M. Thoulet refers to, but does not describe, his own theory as to the origin of the Grand Banks of Newfoundland, which differs from that hitherto accepted by physical geographers, the source of the material of the banks being sought, not in Arctic glaciers but on the frost-riven shores of Newfoundland.

We feel strongly that the volume before us is valuable, and capable of being made useful in a high degree. Much of its matter is so open to controversy as to detract from its permanent value; but by directing the attention of oceanographers to the weak places in accepted theories, the bold and ingenious hypotheses of M. Thoulet cannot fail to advance knowledge. He deserves thanks and congratulation for his effort, and we trust that he will be encouraged to extend his researches and his writings to include the more interesting, because more difficult, problems of marine circulation and the inter-relations of sea, air, and land. We believe, however, that it is the geographer, or rather the physiographer, studying the system of the world as a whole, not the mere chemist or physicist, geologist or surveyor, who is likely to be most successful in recognising the elements of oceanography where they now lie scattered, and in combining them to form a whole department of experimental science. In this confidence we would urge on M. Thoulet the importance of approaching his subject from the general point of view, so as to obtain the true perspective, and see how to fill in most effectively the special details, of which he has shown himself so skilful a master.

GEOGRAPHICAL NOTES.

EUROPE.

The Meteorology of Scotland in 1889.—The most remarkable feature of the year was the distribution of temperature. In May and June the heat was quite exceptional, the mean monthly temperature in the former month being 53°·1, or 4°·3 above the average; and in June 57°·1, or 2°·4 above the average of 1856-88. Then followed a period of abnormally low temperature, lasting to November, when, as well as in December, the temperature was again appreciably above the average. These deviations, however, so nearly counterbalanced one another that the mean for the year (46°·7) is only 0°·5 above the average for the preceding thirty-three years. On the other hand the difference between July and December was 16°·9 in place of 19°·5, the average for the same years. The deficiency of rain, which

had been observed in the five preceding years, was also noticeable in the records of 1889.—*Journal of the Scottish Meteor. Soc.*, Third Series, No. 7.

The Meteorology of Ben Nevis.—Observations have now been made on the summit of Ben Nevis and at Fort-William for seven complete years, besides those made by Mr. Wragge during the summer months (June to October) of 1881-82-83. The results are given in the *Journal of the Scottish Meteor. Soc.*, Third Series, No. 7. The times at the two stations were exactly the same. The barometric observations at Fort-William have been reduced to 32° and sea-level, and those at the summit of the mountain only to 32°. The horizontal distance between the two stations is only about four miles, so that the difference of atmospheric pressure is virtually an effect of height and temperature. Some interesting calculations respecting the relation between pressure and temperature were given at the last meeting of the British Association in the *Report* of the Committee appointed for co-operating with the Scottish Meteorological Society in making Meteorological Observations on Ben Nevis. From the means for the years 1881-89 it appears that the difference of pressure at the two stations reaches a minimum of 4·485 inches in July. As the temperature sinks, and the air, consequently, contracts, a portion of it falls below the level of the upper station, and the difference of pressure increases until it attains a maximum of 4·632 inches in February. The mean temperatures of the stratum of air between the foot and summit of the mountain in these months are 48°·5 and 30°·5 respectively. Therefore the vertical displacement of the mass of atmosphere for a temperature difference of 18° is represented in barometric pressure by the difference of this maximum and minimum, or 0·147 inches. But the sea-level pressures are 29·876 inches in February, and 29·841 inches in July. If, then, the sea-level pressure in July be taken as 29·876 inches, and the pressure, 25·356 inches, at the summit be proportionally increased, the difference will be 4·490 inches instead of 4·485, and therefore the vertical displacement for a difference of 18° in temperature, and at the same sea-level pressure, will be 0·142 inches.

In order to determine a curve showing the barometric differences, they were referred to a difference of 4·560, which is approximately the mean annual difference, as a mean point. Thus, the July difference, 4·485, then becomes -75. When the quantities thus obtained were set down as ordinates, and the times as abscissæ, it was evident to the eye that a curve of sines was obtained. The extreme value in thousandths of an inch is 75, being derived from the July maximum. If, then, a be the time and $\delta\beta$ the difference, the equation obtained is $\delta\beta = 75 \sin a$. Similarly, the mean readings of the thermometer satisfy the equation $\tau = 9 \sin a$, approximately ; but the deviations are greater than in the former case. Consequently the barometric difference varies as the increment of the mean temperature of the two stations—an unexpectedly simple relation. The importance of this result with regard to inquiries dealing with the relations of height to pressure and temperature is self-evident.

The mean annual differences of temperature of the top and bottom of the mountain, deduced from (1) the mean monthly temperature, (2) the highest mean monthly temperature, and (3) the lowest mean monthly temperature, Dr. Buchan gives as 15°·9, 15°·4, and 16°·2 respectively. The smaller difference in the second case he ascribes to the unusually high temperatures on the summit during the anticyclonic weather that prevailed in the June months of 1887 and 1889. The lowest mean monthly temperatures show the steadiest differences from month to month, probably because the summit, being a true peak, favours the descent of the air cooled by terrestrial radiation. The highest mean

monthly temperature on Ben Nevis was 45°·6 in June 1887, and the lowest 20° in January 1886, the difference being, therefore, 25°·6, while the absolutely highest and lowest were, respectively, 67°, on June 24th, 1887, and 6°·4 on February 10th, 1889, showing an extreme range of 60°·6. The mean annual rainfall during the years of observation has been 140·17 inches at the top of Ben Nevis, and 78·19 at Fort-William. The maximum mean monthly rainfall at the top is 18 inches, in December, and at Fort William 11·06 inches, in January. This result confirms Dr. Buchan's statement in the *Journal of the Meteor. Soc.*, vol. iii. p. 249 (1872), that, as regards the West of Scotland, the heaviest rainfall in places open to the Atlantic occurs in December. The difference between the two stations reaches a maximum in December and a minimum in April, gradually increasing or diminishing except in the months of March and November ; the fall in the former being above, and in the latter below, the true proportional quantity. This is probably a characteristic feature of the meteorology of Ben Nevis, due to the peculiarity of the winds at those seasons. The difference of rainfall on the summit and at the foot, 5·11 inches, calculated from the mean monthly rainfall, is approximately the mean of those derived from the mean highest and lowest, 9·33 and 2·62 inches respectively, thus showing that the excess on the top in very wet months is equal to the deficiency in very dry months. The average annual number of fair days, or days when less than one-hundredth of an inch of rain fell, was 95 for the years 1884-90. The monthly mean rises to 12 inches in April, and falls to 5 inches in July and October. The sunshine record, extending from March 1884 to the end of November 1890, shows an annual mean of 698 hours out of a possible 4470. With regard to the diurnal variation of pressure, the most strongly marked of the four phases is the morning minimum, a peculiarity common to all high-level observatories situated on peaks. The afternoon minimum is small, and falls below the daily mean only during the winter months. In this connection it is interesting to notice that last summer on Mount Blanc the afternoon minimum entirely disappeared, the diurnal curve showing only one strongly pronounced maximum and minimum. The diurnal variation of temperature is also peculiar, never exceeding one degree in November, December, and January. "In truth, it may be considered that the fluctuation of temperature may be regarded as showing the real changes of temperature going forward in the atmosphere at the time, with the diurnal variation virtually eliminated —a consideration of some value in weather forecasting."

The article contains a large amount of interesting information on other subjects, such as winds, formation of ice-crystals, St. Elmo's fire, etc., which is not possible to give in a short note.

AFRICA.

Exploration of the Mono.—M. Al. d'Albéca, the Administrator of the French Possessions on the Bight of Benin, has followed this stream, which discharges into the sea near Grand Popo, from Agome-Seva to Togodo, the limit of navigation, and thence in two days' march he reached Tune, which lies in the same latitude as Abome, and at a distance of six hours' journey from it. According to d'Albéca, the whole of the lower course of the Mono traverses French territory, whereas Togodo has always been supposed to belong to Togo-land. Considering, however, that the river-bed is very tortuous and that no points were determined by observation, the accuracy of the assertion may well be doubted.—*Petermann's Mitt.*, Bd. xxxvii., No. 3.

Cameroons.—It is announced, by telegram, that Lieut. Morgen arrived at the beginning of the year at Ibi on the Benué, thereby connecting the explorations of

the southern Cameroons region with the observations of Flegel and Zintgraff in Adamawa. He left the Yaunde station on the Sannaga in October 1890, travelled at first in a north-easterly direction to Tibati, which Flegel vainly endeavoured to reach, and thence through Banyo to the Benué.—*Petermann's Mitt.*, Bd. xxxvii., No. 3.

The Partition of Africa, January 1891.—The following table has been compiled for the current issue of the *Statesman's Year-Book* by Mr. E. G. Ravenstein, F.R.G.S.:—

	Area.	Population.	Inhab. to a Square Mile.
British Africa:			
Gambia,	2,700	50,000	19
Sierra Leone,	15,000	180,000	12
Gold Coast,	46,600	1,905,000	41
Lagos and Yoruba,	21,070	3,000,000	142
Niger Territories and Oil Rivers,[1]	290,000	17,497,600	60
British Guinea,	375,370	22,632,600	60
Cape Colony (with Pondo Land and Walvisch Bay),	233,430	1,700,000	7
Basutoland,	9,720	180,000	19
Natal,	21,150	540,000	25
Zulu and Tonga Lands,	14,220	180,000	13
British Bechuanaland,	43,000	44,000	1
Bechuanaland Protectorate,	127,000	50,000	0·4
Zambezia, Nyassaland, etc.,	540,000	1,100,000	2
British South Africa,	988,520	3,794,000	4
Zanzibar and Pemba,	985	165,000	167
Ibea, to 5° N. latitude,	245,000	5,600,000	23
Rest to Egyptian frontier,	820,000	7,000,000	8
Northern Somal Coast,	30,000	240,000	8
Sokotra,	1,382	10,000	7
British East Africa,	1,097,367	13,015,000	12
Mauritius, etc.,	1,053	390,000	371
St. Helena, Ascension, and Tristan da Cunha,	126	5,000	4
Total British Africa,	2,462,436	39,836,600	16
French Africa:			
Tunis,	44,800	1,500,000	33
Algeria,	184,500	3,820,000	21
Sahara,	1,568,000	1,120,000	0·7
Senegambia (old possessions),	51,000	250,000	5
Gold and Benin Coasts,	7,500	250,000	33
Sudan (remainder),	475,500	8,800,000	18
French Congo (and Gabon),	220,000	2,500,000	11
Obok (Bay of Tajura),	2,320	23,000	10
Madagascar and dependencies,	228,600	3,520,000	16
Comoros,	760	64,000	84
Réunion,	970	166,000	171
Total French Africa,	2,783,950	22,013,000	8

[1] Inclusive of Sokoto (121,000 sq. miles, 9,800,000 inhabitants) and Gando (98,500 sq. miles, 6,000,000 inhabitants), with Borgu and territories tributary to Sokoto on the north.

	Area.	Population.	Inhab. to a Square Mile.
Portuguese Africa:			
Portuguese Guinea,	11,600	150,000	13
Angola,[1]	603,000	3,600,000	6
Mozambique,	293,000	1,500,000	5
Madeira,	314	136,000	433
Cape Verde Islands,	1,490	111,000	75
St. Thomé and Principé,	420	21,000	50
Total Portuguese Africa,	909,824	5,518,000	6
Spanish Africa:			
Tetuan, etc. (Morocco),	27	6,000	222
Sahara,	243,000	100,000	0·4
Canaries,	2,800	288,000	103
Gulf of Guinea,[2]	930	50,000	54
Total Spanish Africa,	246,757	444,000	2
German Africa:			
Togoland (Slave Coast),	16,000	500,000	31
Camarons (Kamerun),	130,000	2,600,000	20
South-West Africa,	324,000	250,000	0·8
East Africa (with Mafia),	361,000	1,760,000	5
Total German Africa,	831,000	5,110,000	6
Italian Africa:			
Eritrea,	56,100	660,000	12
Abyssinia,	189,000	4,500,000	24
Somal Coast,	70,000	210,000	3
Total Italian Africa,	315,100	5,370,000	17
Summary:			
British Africa,	2,462,436	39,836,600	16
French Africa,	2,783,950	22,013,000	8
Portuguese Africa,	909,824	5,518,000	6
Spanish Africa,	246,757	444,000	2
German Africa,	831,000	5,110,000	6
Italian Africa,	315,100	5,370,000	17
Congo State (Belgian),	827,000	15,000,000	18
Boer Republics,	163,400	810,000	5
Liberia,	37,000	1,050,000	29
Turkish (Egypt and Tripoli),	836,000	7,980,000	10
Unappropriated,	2,021,583	23,868,400[3]	12
Great Lakes,	80,350	.....	.....
Total Africa,	11,514,300	127,000,000	11

The Mungo River.—Herr Schran has, during the years 1885-1890, surveyed the basin of the Cameroons river and its tributaries; and in the *Mitt. aus den Deutsch. Schutzgebieten*, Bd. iv. Heft 1, a description of the Mungo River is given, accompanied by a map of the river and the route to the Elephant Lake. The Mungo

[1] Including the whole of Lunda, a portion of which will probably be ceded to the Congo State as a result of the arbitration of the Swiss Government.

[2] Spain also claims some 70,000 square miles on the mainland.

[3] Unappropriated Africa includes Morocco (219,000 square miles, 6,000,000 inhabitants), Bornu with Kanem (80,000 square miles, 5,100,000 inhabitants), Wadai (172,000 square miles, 2,600,000 inhabitants), Bagirmi (71,000 square miles, 1,500,000 inhabitants), etc.

flows into the Modeaka Creek, and sends out an arm, the Mungo Creek, into the Cameroons River. Its mouth is narrow, and in some places so shallow that a small steamer, drawing three feet of water, can only pass at high-tide. The general direction of the winding stream is at first from the west, till the Mungo Creek and the Mungo villages are reached (about three-quarters of a mile up), where it makes a sharp bend and flows from north to south.

At first the country is very monotonous, but farther up the stream hills appear on the right bank. Several small creeks enter the main stream, and the current is very rapid. Above Ekumbi the banks increase in height up to the rapids above Bonkoi, which form an obstacle to further navigation. From Eliki Strand and from Mundame roads lead to the Barombi ba Mbu station, near the Elephant Lake. The soil on both sides of the river above the Mungo villages is very rich, and abundance of timber stands ready for the axe.

The Bayaga.—At a meeting of the Paris Geographical Society, held on 5th December, a letter was read from M. Paul Crampel, in which he describes a dwarf race inhabiting the forests to the north of the Ogowé. M. Crampel found several families of this people at about 13° 20′ E. long., and 2° N. lat. living amongst the Fans in a state of vassalage. When a Fan chief becomes sufficiently powerful, he takes under his protection a group of these dwarves, and establishes them in the bush near his village. They then become his hunters, and, in exchange for the ivory and meat they procure, receive old rags, broken guns, manioc, etc. The Bayaga, on their side, enter this state of servitude voluntarily, for, having no plantations, they cannot otherwise procure vegetarian food; but when their feudal lord is too exacting, they leave the neighbourhood. Their average height is 4 feet 7 inches. They are squarely built, well proportioned, and muscular. The colour of their skin is a yellowish-brown, and hair grows all over their bodies. At first sight one is struck by the prominence of their bushy eyebrows and their high cheekbones. They have short necks, high shoulders, broad and rounded chests, strong arms, and thick wrists. When at rest, their feet are generally turned inwards, and their knees, calves, and feet seem as though they were all in one piece. Their general expression is one of fear, and when any one looks at them they hang their heads and appear to tremble. Each head of a family lives with his children and grandchildren, and into this little community no stranger in blood is admitted. When a young Bayaga wishes to marry, he is provisionally adopted into the family of his intended bride, and, after a long period of service in hunting and collecting honey for the community, is allowed to marry; but he must still remain in the family of his wife until he has a son, and this son has killed an elephant. He may then depart with his wife, leaving the son in her stead. Polygamy is permitted, but the scarcity of women and the family organisation place great obstacles in the way of its practice. —*Compte Rendu, Paris Geog. Soc.*, Nos. 16 and 17, 1890.

The Two Lomamis.—The reports of MM. Delcommune and Janssen regarding the navigation of the Lomami, which enters the Congo below Stanley Falls (*S. G. M.* vol. v., p. 502, and vol. vi., p. 260), turn out to be incorrect. M. Hodister ascended the river last summer, and found that the station Bena-Kamba is situated at about 2° 50′ S. lat., opposite Riba-Riba on the Congo, and not, as formerly stated, on the same parallel as Nyangwé. Though the *Mouvement Géographique*, No. 29, 1891, is unable to state by what method this new latitude was obtained, its correctness is to a great extent proved by the subsequent movements of M. Hodister. Steaming up the river above Bena-Kamba for a space of twelve hours, he reached the rapids, where he disembarked, and followed the river bank on foot. Taking a southerly direction, he came, after four days' march, to the Shari district, which contains a

population of 10,000 souls. Quitting the river a second time, M. Hodister marched in ten and a half hours to the village of Itumba, where he at last found himself in about the latitude of Nyangwé ; then, turning eastward, he reached the Congo at that place. After paying a visit to Kasongo, he descended the Congo to Riba-Riba, and returned to Bena-Kamba by a route running due west. The distance between the rivers, 65 miles or rather more, was covered in twenty-eight hours.

Lieut. Paul le Marinel has explored the other Lomami, the tributary of the Sankuru, and proved its identity with the Lubefu crossed by Wissmann. The Lomami, which enters the Congo at Isangi, is the river seen by Cameron in Urua. Lieut. le Marinel, coming from Lusambo on the Sankuru, struck the latter Lomami at about 5° S. lat., and, following it northwards, found that from lat. 4° 45′ S., to a little above Bena-Kamba, its course is impeded by a succession of rapids. The *Mouvement Géographique* of April 5th contains a map of this region from the itineraries of Wissmann, Delcommune, P. le Marinel, and Hodister.

Madagascar.—On Dec. 5, 1890, M. Grandidier communicated to the Paris Geog. Society (*Compte Rendu*, Nos. 16 and 17) some details concerning the explorations of MM. Catat and Maistre in this island, of the geography of which little is accurately known. In the centre of the island rises a vast mass of granite. On its eastern side runs a coast range of primitive rocks, while on the other sides lie plateaus of secondary origin, more or less diversified. The southern boundary of the main elevation has been ascertained approximately, but its northern extension was unknown before the expedition of the French explorers. The watersheds between the rivers of the south and the distribution of the forests have also been determined by them. After M. Foucart's return from the valley of the Mangoro (*vide* vol. vi., p. 425), in such a bad state of health that he was obliged to leave the island for Europe, MM. Catat and Maistre journeyed from Antananarivo to Tamatave by what is known as the route of Radama I., having been followed by him on his expedition against the eastern tribes. It has long been the belief of European residents on the east coast that this route was shorter and less arduous than the one usually followed. It was found, however, that cutting, as it does, the coast range and its numerous bastions obliquely, the road has frequent changes of level, and that the difference in length is not so great as might have been expected. It passes through the large marsh of Didy, enclosed like those of Antsihanaka and Ankay between the main range and the coast mountains, and drained by the Ivondrona, one of the chief rivers of the eastern coast. Along this river MM. Catat and Maistre descended to the coast, and then proceeded to Antongil Bay with the intention of crossing the island along the 16th parallel. M. Maistre, however, was obliged by a severe attack of fever to return to Antananarivo, which he did by way of Fenoarivo and Antsihanaka. The latter place, he found, is placed on maps too much to the east. Meanwhile Dr. Catat crossed the island from Mananara to Mojanga (Mayunga). From the scanty information received it would appear that the central range does not extend northwards to the 16th parallel, but that the vast undulating plains of secondary formation, clothed with fan-leaved palms and other characteristic plants, occupy more than two-thirds of the breadth of the island. Dr. Catat travelled from Mojanga to Antananarivo by the valley of the Ikopa, and, accompanied by M. Maistre, went southward and discovered the sources of the Onilahy, which enters the St. Augustin Bay, of the two large rivers of Androy (Antandroy), the Manambovo and the Mandrary, and one of the parent streams of the Mananara. On July 5th they reached Fort Dauphin, as already announced on p. 164.

According to an account published in the *Zeitschrift für Erdkunde*, by Dr. A.

Voeltzkow, who, with Mr. Knott, visited last August the Kinkoni district, to the east of Bembatoka Bay, this district is quite independent of the Hova Government, and had not previously been visited by Europeans. The Kinkoni Lake is drained by the Mahavari. A river, the Manzarai, figuring prominently on our maps, is said not to exist at all.

AUSTRALASIA.

Australasian Federation.—*The Times* of April 3d gives particulars of the Australasian Federation Convention Bill. Its chief provisions are as follows :—

The Act will be called "The Constitution of the Commonwealth of Australia," and will come into force within six months after its adoption by the Imperial Parliament. The colonies will be called States. The Federal Council Act will be repealed. The Legislature will consist of the Queen, a Senate, and a House of Representatives.

The Governor-General will be appointed by the Queen at a salary of not less than £10,000 a year.

The Senate will consist of eight members from each State, chosen by the Parliaments of each State for six years, half retiring every three years, and the President of the Senate will be chosen by the Senate itself.

The House of Representatives will be elected every three years by the people of the several States, in proportion to their population, on a basis of one member for every 30,000 inhabitants, but no state shall send less than four. The members of both Houses will receive £500 each per annum.

Ministers will not be compelled to offer themselves for re-election on appointment.

The legislative power of the Parliament will extend over customs and taxation, public loans, military and naval defences, matters connected with the currency, weights and measures, navigation and means of communication, foreign affairs, etc., and such questions as are at present decided by the Imperial Parliament or the Federal Council of Australia. With regard to procedure it is laid down that laws appropriating revenue or imposing taxation must originate in the House of Representatives. The powers of the Senate will be co-ordinate with those of the Lower House, except with regard to appropriation and taxation Bills, which the Senate may affirm or reject, but not amend. Laws imposing taxation will deal with taxation only, and, with the exception of customs and tariffs, with only one subject. Money Bills of a general character must not be tacked on to appropriation Bills, and, in the case of Bills which the Senate may not amend, it may return the same to the Lower House with a message requesting it to omit or amend any item, and the Lower House may, on receiving such message, if it thinks fit, make such omissions or amendments.

The prerogatives of the Crown and the Executive Government are defined by the following regulations :—The Governor-General's assent is required for all measures, and he will have the power of reserving any measures for the Queen's approval. Her Majesty in Council may disallow any Bill within two years after its receipt. The executive power vested in the Queen will be exercised by the Governor-General, advised by a Council of seven Ministers, who may sit in either House ; £15,000 to be set apart for the payment of Ministers.

The Governor-General will be the commander-in-chief of the military and naval forces. The Executive Government, as soon as formed, will take over the control of customs, excise, post and telegraphs, military and naval defence, ocean beacons, buoys, lighthouses, lightships, and quarantine.

The Supreme Court of Australia will consist of a Chief Justice and not less than four Judges, and will be the final Court of Appeal for Australia; but the Queen may, in all cases where public interests are involved, grant leave to appeal to herself in Council. An indictable offence must be tried in the State in which the offence has been committed.

Each State will retain the powers it at present possesses, except those expressly delegated to the Commonwealth. When a State law is inconsistent with the law of the Commonwealth, the latter will prevail. The Governors of the States will be appointed by the local Parliaments.

Free-trade is to be established between the States.

Lastly, any law for the alteration of the Constitution must be passed by an absolute majority of the Senate and the House of Representatives, and thereupon be submitted to conventions elected by electors of the several States qualified to vote for the election of members of the House of Representatives. Such conventions will be held as the Parliament of the Commonwealth shall prescribe. If the proposed amendment be approved by the conventions of a majority of the States, it will become law, subject, however, to the Queen's power of disallowance; but an amendment by which the proportionate representation of any State in either House of the Parliament of the Commonwealth is diminished will not become law without the consent of the Convention of that State.

This Bill will be referred to the Colonial Legislatures for adoption, and will then be forwarded to the Imperial Parliament.

GENERAL.

The Black Sea.—Last year the Russian Admiralty sent out the gunboat *Tchernomorets* on a scientific expedition in the Black Sea. Captain Spindler was appointed as leader, and Baron F. F. Wrangell and Dr. N. J. Andrussof were sent by the Russian Geographical Society, the former to assist in the soundings, observations of temperature, etc., while the latter studied the fauna of the sea. The *Tchernomorets* left Odessa on June 26th, and returned to that port on July 23d. Its course was from Odessa to Sevastopol and thence to the Bosporus; the coast of Asia Minor was then followed to the neighbourhood of Amaserah, from which point the sea was crossed to Theodosia. Skirting the coast of the Crimea to Sevastopol, the expedition then made for the Caucasian coast, but at a distance of 20 miles from Pitsunda turned more to the south and steered for Batum. After leaving this port the gunboat steamed westwards to the longitude of Samsun, and by a circuitous route returned to Sevastopol and Odessa. The soundings taken on this expedition and on previous occasions show the Black Sea to be a deep basin, more than the half sinking below 6500 feet. On the whole, the slope between the depths 650 and 4250 feet is very steep, particularly near Gelenjick on the east coast, near Alupka on the south coast of the Crimea, and near Amaserah. The only extensive part of the sea which has a depth of less than 650 feet is at the north-west, cut off by a line drawn from near Burghas to a point in the Crimea south of Cape Tarkhankut. Between Burghas and the Bosporus, along the western part of the coast of Asia Minor, and near the Straits of Yenikale the 650 feet line also recedes to some distance from the coast. Near the Crimea and the northern coast of the Caucasus the 6500 feet line approaches very close to that of 650 feet. Farther south the interval is rather larger, and expands still more to the west. The deepest part, about 8500 feet, has not been thoroughly investigated. It does not extend

westwards beyond the meridian of Eupatoria (33¼° E.), and forms a narrow belt as far as the meridian of Sinope, beyond which it widens out. Its eastern limit has not been determined. Professor A. Voeikof gives a table in *Petermann's Mitt.*, Bd. xxxvii., No. 2, showing the temperature of the water at various depths and its density. From this it appears that the surface temperature in the shallower parts was highest in the extreme north-west, being 77°·2 F., while near the Bosporus it was 73°·6; off the south coast of the Crimea, 73°·8; and in the open sea between Burghas and Sevastopol, 75°·9. Whereas, however, in the first case, the temperature sank to 42°·8 at a depth of 21 fathoms, at the other stations it did not reach a minimum till a much greater depth was attained. In the open sea a temperature of 44°·3 was registered at a depth of 35 fathoms. Lower still the temperature rises slowly. At the deep-sea stations the surface temperature was 73°·7, and the minimum of 44°·9 was reached at 29 fathoms, after which the temperature slowly rose to 48°·7 at a depth of 1180 fathoms. The higher temperature in the depths of the sea near the Bosporus is explained by the current of warmer water which flows in from the Sea of Marmara, the existence of which is also confirmed by the density of the water near this strait. Close to the surface the density, which is a measure of the salinity, is peculiarly small, owing, doubtless, to a current from the Danube, but increases rapidly in the lower layers, where the more highly impregnated water of the Sea of Marmara finds its way in. The greatest surface density is found in the centre and near the coast of Asia Minor, where the rainfall is small and there are no large rivers, whereas on the west coast the Danube and Dnieper pour forth large quantities of fresh water.

Dr. Andrussof calls attention to the presence of *Lithamnia*, horny sponges, and *Holothuria*, which have never before been found in this sea, and to the great abundance of star-fishes. Everywhere, except in the vicinity of the Bosporus, is found at a depth of 30-35 fathoms a mud containing small soft molluscs (*Modiola phaseolina*, *Scrophicularia alba*, *Trophon* and *Ceratium*), small *Ophiurida* and *Ascidia*, *Polycnæta*, etc. Beyond 35 fathoms the pelagic fauna is identical with the littoral, and at 100 fathoms the limit of living organisms is reached. Between this depth and 1000 fathoms is found a light-grey viscous mud, containing half-fossilised shells of *Cardium*, *Dreissena*, and *Micromelania*, and in the greatest depths greyish-blue mud with white organic remains—the skeletons of pelagic organisms, such as the *Coscinodiscus*, and the vertebræ of fishes. Between 200 and 400 fathoms half-fossilised shells of molluscs, such as live in the brackish estuaries of the Black Sea, were dredged up. It is impossible that these molluscs should exist in such briny water, and, as it is improbable that the shells should be carried so far by currents, especially as the shells of the nearest shores are not found with them, Dr. Andrussof supposes that, after the Sarmatic sea of the Quaternary Period, a lake of brackish water occupied this site, in which these organisms lived. When, however, the channel of the Bosporus was broken through and salter water flowed in, they were no longer able to exist in the open sea, and some escaped to the neighbouring lagoons and estuaries, while the rest perished. At the same time the fauna was to some extent replaced by new forms from the Mediterranean, but the entrance of deep-sea fauna was obstructed by the shallowness of the Bosporus and by the production of sulphuretted hydrogen in the deeper waters, whence, owing to feeble circulation, it is very slowly carried off. That this sluggish circulation exists is proved by the observations of Makarof, according to which the quantity of water flowing through the Bosporus into the Black Sea is only 200,000 cubic feet a second, amounting in the year to little more than half the volume that passes under the railway bridge on the Volga above Sysran; and at this rate the basin of the sea would not be filled in less than 3080 years. Moreover, the larger portion of this water is

absorbed by the more rapid circulation of the upper strata, so that the water of the abysmal depths is probably renewed only once in some ten thousand years.

Professor Voeikof remarks that the brackish water from the Sea of Azov evidently does not reach the Bosporus, as the density in the upper strata is greater in the middle of the Black Sea than in the west, and that, therefore, in the eastern portion, evaporation must counterbalance the influx, and be somewhat in excess in the centre, the loss being made good by a current from the east. He also draws a parallel between the Caspian and Black Seas, both being shallow in their northern, and deep in their southern, parts. The Sea of Marmara is the only other sea in which the temperature of the deeper strata gradually rises towards the bottom, and only three other seas have a higher mean temperature between the surface and a depth of 6500 feet, namely, the Red Sea, the Mediterranean, and the Sulu. Since the lowest temperature in the Black Sea is found at 30 fathoms, Professor Voeikof thinks it probable that an annual variation of temperature does not exist below 150 fathoms, whereas in the western basin of the Mediterranean it vanishes at about 1150 fathoms, and in the Lake of Geneva at about 820. He explains this phenomenon by the theory that the rapidly increasing salinity in the lower strata confines the convection currents within very narrow limits. Much yet remains to be investigated, particularly in the biology and geology of the sea. The temperature of the surface at different seasons has also to be ascertained, and the eastern part has been less explored than the western.

The Relation of High Winds to Barometric Pressure, from observations carried out at the Ben Nevis Observatory, was the subject of a paper from Dr. Alexander Buchan, at a meeting of the Royal Society of Edinburgh on 2d March 1891. This was a question, Dr. Buchan said, which had been much discussed in recent years—some meteorologists maintaining that the influence of high winds was to depress the barometer, others that it was to raise the barometer, and several others, again, that it had practically no effect whatever. In the discussion of the Ben Nevis observations, particularly from the time that hourly observations began to be obtained from the low-level observatory at Fort-William, in July last, the first question that appeared to him calling for thorough investigation was this question of the relation of the winds to the readings of the barometer, inasmuch as, till this relation be approximately determined, the proper discussion of nearly the whole of the observations cannot be satisfactorily proceeded with. This arose from the manifest disturbing influence of high winds upon the readings of the barometer at the top of the Ben. Since the two observatories are only about 4 miles apart in horizontal distance they are virtually one observatory as regards geographical distribution of pressure; and as the observatory at the top was peculiarly exposed to high winds, the violence of many of which those living on lower levels could really form no conception, while the low-level observatory at Fort-William was much sheltered from winds, the two presented conditions for an exact determination of the question of the influence of winds on the barometer, from data which had not hitherto been available. The observations at the top were made on Beaufort's wind-scale, ranging from 0, representing the calms, to 12, the greatest hurricane likely to occur. These observations had been carefully compared in connection with the registrations of a modification of Robinson's anemometer, which had been specially constructed by Professor Chrystal to meet the exigencies of observing at the top of the Ben. An elaborate comparison had been communicated by Mr. Omond to a meeting of the Royal Society some time ago, in a paper in which he had arrived at the equivalent in miles per hour for each degree of Beaufort's scale. The next step followed in the present inquiry was to

reduce the observations at both observatories to sea-level, and thereafter to enter the differences between the two barometers in columns headed 0, 1, 2, etc., of Beaufort's scale. This had been done for the six months ending January last; and as it was desirable to increase the number of observations at the higher velocities in order to obtain good averages, the observations made five times daily at Fort-William from the beginning of 1885 were compared with those made at the same hours at the top of the Ben, when the wind was at 5 and other velocities up to 11. From these results monthly averages of deviations of the two barometers were deduced, with the result that in all cases a reduced barometer for the top of the hill read lower than that at Fort-William, and the amount is proportioned to the force of the wind. Thus, in calm weather the Ben Nevis barometer was only one-thousandth of an inch lower than that of Fort-William, and as the velocity of the wind increased, the depression gradually became greater up to force 4, when it was fourteen-thousandths lower. From this point it more rapidly increased, till at force 7 the depression was half the tenth of an inch; at force 9, fully the tenth of an inch; and at force 11, a tenth and a half of an inch. These differences, being exhibited in a diagram, showed a remarkable curve of depression corresponding with increased velocity of wind. The results, Dr. Buchan pointed out, might be put to important uses in meteorology, particularly in endeavouring to establish the relation between the barometric gradient and wind-velocity in storms. Hitherto this relation had been attempted to be established from the results as observed—though, it had to be confessed, with not very satisfactory results. Now, however, by applying corrections in accordance with what had been arrived at, this important practical question in meteorology could be attacked with good hopes of success. Dr. Buchan further pointed out that, as regarded the mean distribution of pressure over the British Isles, the lower pressure hitherto determined at places on the West Coast peculiarly exposed to strong winds and storms might be due not so much to a natural depression of the barometer in these regions as to the lowering of the barometer by the wind-force that swept past the stations where the observations were made.

MISCELLANEOUS.

The **Tenth Census of the United Kingdom** was taken on Sunday, 5th April.

M. Chaffanjon has accomplished a journey **from the Orinoco to the Essequibo.** Starting from Bolivar on the Orinoco, he traversed the basin of the Lower Caroni, and then descended the Cuyuni from its confluence with the Yuruan to its mouth in the Mazaruni.

Our Hon. Corr. Member, Dr. Robert Bell, has sent us a pamphlet **On Glacial Phenomena in Canada.** He asserts that, with the exception of the northern part of the Labrador coast range, the valleys of the Athabasca and the Clearwater, and one or two other small areas, the whole surface of the Dominion, from the boundary of the United States to Baffin-land, has been thoroughly ice-swept.

In a paper read before the Royal Society of Edinburgh, Mr. J. Y. Buchanan demonstrated, from the results obtained by the chemical analysis of numerous specimens of mud dredged up on the *Challenger* Expedition and on the west coast of Scotland, that **Marine Organisms** perform the same work in the comminution of the mineral matter found at the bottom of the sea, that earth-worms do in the renewal of terrestrial soil.

NEW BOOKS.

Zehn Jahre in Aequatoria, und die Rückkehr mit Emin Pacha. Von Major Gaetano Casati. Bamberg: Buchnersche Verlagsbuchhandlung, 1891.

With the exception of the "Learned Doctor" himself, there are few, if any, witnesses of the tragic fall of the Egyptian Equatorial Province more competent than Major Casati to give evidence in this respect. The public may therefore be credited with an eager desire to learn what Major Casati has to say.

Opinions will be divided on the true merits and geographical value of this work. Unfortunately, Major Casati lost the bulk, if not all, of his notes, on the occasion of his captivity by King Chua (better known as Kabba Rega); so that the author was bound to draw upon his memory for much of the information he supplies, and, presumably, on his imagination for the numerous dialogues that enliven his pages. Perhaps for the same reason, or, it may be, on account of haste, Major Casati's narrative reminds one of nothing more striking than the rambling reminiscences of a man broken down in spirit. It is almost impossible to follow him in his disconnected accounts of wanderings in a strange land, interspersed as these are with interjected paragraphs and chapters, the chief excuse for the appearance of which would appear to be that a place had to be found for them somewhere. This discontinuity of subject, accompanied by a careless literary style, materially detracts from the merits of the book.

Major Casati endeavours to be an impartial, or at least an honest, witness of events that passed under his own observation. He is not always in agreement with Emin Pacha, for very often we find him in active or passive opposition; but he is perfectly frank in stating his objections. Of course, without hearing Emin Pacha, it is difficult to apportion blame, simply because his views and those of Major Casati did not happen to agree on certain important questions of administration. As to recriminations, we have had enough of them, on all sides. It is, however, of interest to note that, far from dealing with the so-called "rebellion" in the sensational style of Mr. Jephson, Major Casati refers to it in matter-of-fact terms. Perhaps he was accustomed to that kind of thing. He says that Mr. Jephson was at no time considered a prisoner, but only a "guest," if an unwilling one. The "rebel Council" he styles the "General Assembly" or "Provisional Government," whilst the chief conspirator himself is respectfully called the Regent. In brief, Major Casati throws new light on the fall of the Province, but it is a light that only increases the depths of the shadows.

When Major Casati narrates his own travels, though our geographical information cannot be said to be thereby greatly enhanced, it must be remembered that he was one of the pioneers in the Wellé-Makwa-M'bangi basin, and that his original information has now for several years been public property. He, however, deserves the credit of breaking new ground.

In spite of what has been said in dispraise of his work, Major Casati will, we hope, find many readers. One is deeply impressed by the courage, devotion, and generosity of spirit that appear to have characterised Major Casati in his adventurous career in the Súdan. In the midst of his greatest trials his thoughts always turned to others, whose sufferings he endeavoured to alleviate.

Both volumes are handsomely illustrated. The illustrations, which are very numerous and are varied in style, are not particularly well reproduced; moreover, some of the subjects are in bad taste, and a good many of the pictures are reproduced, without acknowledgment, from Dr. Buchta's photographs.

Anleitung zur Bearbeitung meteorologischer Beobachtungen für die Klimatologie. Von Dr. Hugo Meyer, Assistent am Königlichen meteorologischen Institut. Berlin : Verlag von Julius Springer, 1891. Pp. 187.

Owing to the multiplication of meteorological stations and the publication of their records, a vast supply of material is now available for climatological investigations, and the observatory staffs are too small to cope with the accumulations. It is, therefore, the object of the author, in publishing this work, to enlist assistants in the task of reducing to order the records of observations and ascertaining the laws indicated by them. He has, therefore, collected the chief methods and theorems employed in dealing with such records, dividing his work into two parts : the first treating of the manipulation of varying quantities, especially by means of curves, and the other with the application of the methods to meteorological phenomena. To those who are prepared to devote time and thought to the subject it will be a useful book, containing, as it does, information to be sought elsewhere in many separate volumes. Dr. Meyer draws particular attention to the advantage of the "Scheitelwerth" over the arithmetical mean usually employed. This "Scheitelwerth," or, as Fechner calls it, the "greatest density value," is that round which the greatest number of observations congregate. Take, for example, the temperature of any given month, and draw a curve, the abscissæ of which represent temperatures and the ordinates the frequency of the corresponding temperature in percentages of the records of observations taken at some fixed hour of the day. The highest point of this curve gives the culminating value alluded to. The substitution of this value, in certain cases, for the usual mean seems to us worthy of consideration. A few days of exceptionally high or low temperature may cause a considerable difference in the mean for the month, and thus a false impression of the character of the month may be formed. If, also, the probability of temperature for any month in the year be calculated from such data, the result will be erroneous. When, however, a long series of years is taken, it may be expected that the deviations will counterbalance one another, and, therefore, we are not inclined to attach quite so much importance to the culminating value as Dr. Meyer claims for it.

Klimaschwankungen seit 1700, *nebst Bemerkungen über die Klimaschwankungen der Diluvialzeit.* Von Dr. Eduard Brückner, a. o. Professor der Geographie an der Universität zu Bern. Mit einer Tafel, 13 Figuren im Texte und zahlreichen Tabellen. Wien und Olmütz : Ed. Hölzel, 1890. Pp. 324.

This work is one of Professor Penck's *Geographische Abhandlungen*, and one of the most valuable of those excellent publications. The author has collected and thoroughly sifted an immense quantity of material, and the labour and erudition devoted to his task merit the highest admiration. Not content with purely meteorological records, he has called to his aid investigations into the variations of the level in the Caspian and other isolated lakes, the movement of glaciers, the breaking-up of the ice in rivers, and the dates of vintages. The evidence derived from these sources has led him to the conclusion that the variations of climate form a cycle of 35 years. Considering how new the science of meteorology is, and that trustworthy records of meteorological phenomena can be obtained only for a comparatively short period, the exactness of this period may be doubted, but Dr. Brückner is able to produce much confirmatory evidence of its approximate correctness. He is inclined to believe that the variations of climate are connected

in some way or other with the emission of heat from the sun, but rejects the theory that they follow the sun-spot periods. He admits that these exercise a certain amount of influence, and that, of late years especially, the coldest and wettest years have approximately coincided with the maxima of sun-spots recurring every eleven years, but this agreement does not always appear when a long period is taken, nor do the meteorological phenomena vary in the same ratio as the sun-spots. In an interesting chapter on the results of change of climate Dr. Brückner deals with its effect on agricultural products, floods, etc., a subject which promises to become a fruitful field for the scientific explorer.

Bibliotheca Geographica Palaestinae. Chronologisches Verzeichniss der auf der Geographie des Heiligen Landes bezüglichen Literatur von 333 *bis* 1878 *und Versuch einer Cartographie.* Herausgegeben von REINHOLD RÖHRICHT. Berlin: H. Reuther's Verlagsbuchhandlung, 1890. Pp. 744.

This important work is an extension of Dr. Titus Tobler's *Bibliotheca* published in 1867, and is the result of three years of labour, having been commenced at the end of 1887. The list of only the most important works consulted contains the titles of no fewer than 314. The number of authors, journals, etc. recorded is 3515, and the dates of publication, translations, etc., are given. The enumeration of the writings of Major Conder occupies several pages, and a considerable space is devoted to Sir Charles Warren and others. It is a pity that so many typical errors have slipped in, at least among the English references. Not only are there such mistakes as "bayways" for byways, "resultat" for result, "pistorial" for pictorial, but adjectives relating to countries and peoples, such as Greek, Christian, Armenian, etc., are printed with small-type initials, from which it may be concluded that the editor is unacquainted with the English custom in these cases. But such trifles, though they ought to be corrected in a future edition, do not detract from the real merit and usefulness of this great work. The cartography will, perhaps, not compare favourably with the preceding part of the volume, chiefly because map-making has made great strides in recent years, and most of the best maps of Palestine have been published since 1878. It contains, however, 747 entries.

Chinesische Studien. Von FRIEDRICH HIRTH. Band I. München und Leipzig: G. Hirth's Verlag, 1890. Pp. 322.

The writer, in a too-modest preface, explains that the papers collected together in this book are the outcome of a study in leisure hours during the last ten years or so, and have in part been already published in various learned organs in Germany. He deprecates the sharp criticism of the learned and the specialist. He need entertain no anxiety on that score. His essays rest upon the soundest foundation: many years' thorough study of original Chinese writings and his own clear, strong, common-sense. Even where one might feel called upon to dissent from his conclusions, one cannot but respect his reasoning, and admire his learning, his shrewdness, and his sober judgment. The papers are not so miscellaneous in character as the table of contents seems at the first glance to imply. More than one-half treat of the commercial history of China, and her historical geography. Amongst the more especially interesting papers are discussions on the commercial relations between China and the West (Syria) in ancient and mediæval times, the porcelain industry of China, the history of glass-making, and of the invention of paper in the Heavenly Kingdom, the Chinese annals as sources for European and Oriental history, the present commercial conditions of China, her

bureaucratic system, foreign words in Chinese and words imported into the international language of commerce from China and the China trade, and the geography of the province of Kuang-tung. Readers interested in the history of commerce will find much that is extremely valuable in these papers; and all who are interested in China will hardly close the book without having enriched their knowledge in some respects. The author has certainly taken a wise step in preserving these useful essays from obscurity and neglect. The book is beautifully printed on excellent paper.

Die Bildenden Kunste bei den Dayaks auf Borneo. Ein Beitrag zur allgemeinen Kunstgeschichte. Von Alois Raimund Hein, k.k. Professor und Akademischer Maler. Mit einem Titelbilde, zehn Tafeln, neunzig Text-Illustrationen, und einer Karte. Wien: Alfred Hölder, 1890. Pp. xiv + 228.

Professor Hein makes, in the present book, a useful contribution to the general history of Art, especially to that department which is not perhaps studied so much as it deserves to be, the artistic faculties and artistic creations of the less civilised peoples.

The Dyaks excel in decorative work far more than in painting, architecture, etc. Many of the readers of this magazine would, we are sure, be greatly surprised to see the beautiful examples of Dyak decorative work figured in the plates to this volume. It is no exaggeration to say that they deserve to rank alongside the decorative designs of some of the highest civilised nations. Prof. Hein's book treats fully and interestingly of the building arts, the modelling, painting, metal, clay, and wood work, textile arts, and tattooing of the Dyaks; and it has an admirable equipment of plates, indexes, tables, lists of authorities, etc. We recommend the work to the serious attention of all students who are interested in the history of art.

Ethnographische Beiträge zur Kenntniss des Karolinen-Archipels. Von J. S. Kubary, unter Mitwirkung von J. D. E. Schmeltz, Conservator am ethnographischen Reichsmuseum in Leiden. Erstes Heft, mit 15 Tafeln. Leiden: Verlag von P. W. M. Trap, 1889. Pp. iv + 114.

This book, which makes its appearance under the protecting ægis of Professor A. Bastian, of Berlin, is the first portion of a work on the people of the Caroline Islands, by a gentleman who has spent some years collecting his materials on the islands of the group about which he writes. The present instalment treats of the money current amongst the natives of Yap and the Pelew (Palau) Islands, the methods of house-construction employed by the people of the first-named island, the industry and trade of the Rook islanders, and some account of the Western Carolines. The book bids fair to be a thorough and exhaustive study of the islanders dealt with, and being based upon first-hand observation, and illustrated with a profusion of plates, will in all probability take its place as an acknowledged authority; and so should be useful to the philologist, the folk-lorist, the ethnologist, and the student of primitive arts and industries, as well as to the geographer.

Religion der Alten Aegypter. Dargestellt von Dr. A. Wiedemann. Münster in Westphalen, 1890. Verlag der Aschendorffschen Buchhandlung. Pp. 175.

This is the third volume of a series of histories of non-Christian religions. Its author has already won a reputation as a writer on ancient Egyptian history; and the present work will undoubtedly add to that reputation. Dr. Wiedemann writes

in clear and graceful language, and with excellent judgment. His book is based almost entirely upon the inscriptions and papyri, and upon knowledge that has been gained at first-hand. The method of interpretation followed is evidently Maspero's, not Brugsch's. The author maintains that no organised religious system, only religious ideas and individual cults, can with justice be attributed to the ancient Egyptians. Consequently he presents his subject under the following divisions :—The worship of the sun, the legends of the sun, the journey of the sun to the Lower World, the most important gods, foreign elements of worship, worship of animals, Osiris and his cycle, the Osirisian doctrine of immortality, the secret (esoteric) sciences, and amulets. An index would have enhanced the usefulness of the book.

An Appeal to Pharaoh. The Negro Problem, and its Radical Solution. New York : Fords, Howard and Hulbert, 1890. Pp. 205.

The United States has its political cancer which, although confined to a portion of the body politic, is of serious and growing danger. This is the so-called Negro problem. The black populations of the Southern States—the descendants of imported slaves—represent the Nemesis of American independence. To their ancestors is due a large share in the rough work of building up those States. They have inherited a grievance and nominal citizenship. They have a political power which race-prejudice does not permit them to wield. They are a constant menace to the white populations, with whom miscegenation—far less fusion—is impossible. But they are there in their millions, and the question is, what to do with them. "Oh, Pharaoh, let the people go !" says the anonymous author of this volume ; "let them go to the land whence we stole their progenitors, to Africa !" And, it must be confessed, the appeal and the argument are strong. It has, however, yet to be shown that the people, as a people, are willing to go, and that the means and the place may be found for the purpose of transportation. The author of *An Appeal to Pharaoh* is an advocate for the task-master, and not for the bondsman : he is disposed to bring about an exodus, with justice to the Negro if possible, but still an exodus. From what he says, and from what we know of the subject, it is clear to us that the Negroes of America would be happier in a more congenial sphere—and why not Africa ?—and that the United States would do well to seriously consider ways and means : for what is possible now may not be possible in another decade, and what would cost a few millions now might cost then many millions sterling and many valuable lives to boot. By all means, then, we cordially support the appeal to Pharaoh : "Let the people go." But let justice be done to those who have already suffered an irreparable injustice !

A Historical Geography of the British Colonies. By C. P. Lucas, B.A. Vol. ii. Oxford : Clarendon Press, 1890. Pp. 343. 12 Maps and Diagrams. *Price* 7*s.* 6*d.*

Mr. Lucas fills this beautifully printed and well-illustrated volume with an account of the British possessions in the West Indies and South America as scholarly and accurate as the preceding volumes would lead one to expect. The work comprises three sections, of which the first describes the Bermudas, the second discusses the British West Indies and the mainland possessions in Central and South America, whilst the third deals with the Falkland Islands. Reference to any part of the contents is facilitated by a copious index. Enough has been said in previous reviews (*S. G. M.*, vol. v., p. 109) of Mr. Lucas's rare power of collecting, arranging, and reasoning upon the geographical facts to which his

official position in the Colonial Office gives him access. Here we find it in no degree abated; and the fact that University culture and official information are reinforced by a firm and easy grasp of geographical principles makes the book of unique value.

It is impossible to over-estimate the importance of such an impartial and exhaustive summary of the geographical history of our West Indian possessions. Most works on colonial geography are haunted with the shade of reports for the encouragement of emigration, or prospectuses of company-promoters, and show a tendency to dwell in an undue degree on future prospects. Here we are told the truth without extenuation and the only light thrown on the future is the powerful ray reflected from the faithful mirror of past changes. To geographers, historians, and, above all, to practical politicians, the pleasant task of studying this work will be its own abundant reward.

Geography of the Dominion of Canada and Newfoundland. By the Rev. William Parr Greswell, M.A. Oxford: Clarendon Press, 1891. Pp. xii + 154. 10 Maps. *Price* 6*s.*

High price and small bulk are the features which first strike one in looking at this little volume sent out under the auspices of the Royal Colonial Institute. The object of the work is to supplement the author's history of Canada, and it may thus be unfair to criticise it as if it were an independent treatise. In the preface we read—"Although many remarks have been made in the text on the ocean currents, winds, rainfall, atmosphere, climate, soils, and general physical conditions of the country, there is no attempt made to arrange these conditions under any general system." This avowed neglect of the first principles of geography prepares us for a more heterogeneous and unorganised compilation than we actually find. As a rule the integral parts of the conglomerate preserve a fine unweathered appearance, and the source of each is faithfully recorded. Some quotations, in no way less intimately related to the subject-matter of the book than those inserted in the text, are placed by themselves at the end in fourteen short appendices. We have noticed several slight errors in detail, and of these the following may be cited. On page 17 the statement "one mile in height means a difference of 15° in temperature" should have 19° as the temperature difference. On page 32 a lake is said to have "a superficies of 360 miles," when the unit should of course be *square miles.* On pages 52, 53, 54, "Cape Breton" is used instead of "Cape Breton Island," and also to signify the cape itself. On page 69 "the Mennonites or German makers" are referred to in a somewhat perplexing way, and on page 76 "the Chinook wind which blows from the west" is likewise left unexplained, although some connection with cattle-ranches is hinted at. The Gulf Stream is not satisfactorily treated, and the Black Stream of the Pacific is described in the words of Maury, whose views of its origin have been greatly modified. Physical geography is certainly not a strong point with the author; many features of great importance are entirely passed over and others mis-stated. On page 95 the Labrador current is credited with singular powers: "As this icy current meets the warm waters of the Gulf Stream it meets and creates vapour which lies upon the eastern sea-board in a dense and thick fog." Fog is not vapour, and vapour is not created but destroyed and rendered visible as water by a cold current meeting a warm one. On page 96 "the mean height of the barometer about 29° 40′" should probably be "29·40 inches." Finally, on page 114, "a township of six square miles" should be *of six miles square, i.e.* of 36 square miles. There are many lists of capes, bays, rivers, lakes, counties, towns, and other features ranged in complete abstraction from terrestrial

associations. The following (from p. 96) is an example, fortunately the only one in the book, of slipshod grammar which has strangely escaped the author's revision :— "Capes.—On the east Cape Primavista, said to have been first sighted in 1497 by Cabot ; Cape Francis, once called Cape de Portogesi, showing by its name, as well as that of Portugal Cove, that the Portuguese had fisheries here. Cape Spear, in the Peninsula of Avalon at the entrance of the magnificent harbour of St. John, on the east ; Cape Race, so well known as one of the first points of land sighted by outward-bound steamers, Cape Pine on the south ; Capes Ray and Anguille at the extreme south-west ; Cape Norman on the north at the entrance of Belle Isle Strait, and on the eastern side of Pistolet Bay, Cape Bauld."

On the whole the book reads smoothly, and the descriptions of sites and scenery are well-chosen and graphic. The distribution of the population is treated admirably and contrasted in a singularly able manner with that prevailing in the Australian colonies. Mr. Greswell has evidently spared no pains to secure the most recent and exact statistics of the various provinces, and to put them together in a way calculated to attract and inform the intending emigrant. The maps are of mediocre quality, and there are no other illustrations. There is an excellent index.

School Geography. Kirchhoff and Sonnenschein. Junior course. London : Swan, Sonnenschein and Co., 1891. Pp. 144. 14 Plates. *Price* 2*s.* 6*d.*

This junior course of geography is intended for the use of both secondary schools and grant-aided elementary schools. It will, we think, if used by an intelligent teacher, amply fulfil its object. Six chapters are devoted to preliminary matter and definitions ; and four useful appendices are added on the metric system, the thermometer, table of heights and angles. The illustrations are good. The authors are mindful of the maxim, "first oversight then insight," and say "This is what is meant by concentric teaching ; each course should be a complete whole in itself ; never should the pupil be dismissed with a scrap of knowledge, which he himself feels to be a mere fragment : but each succeeding course should have a wider sweep, should convey ampler and deeper knowledge, and should treat the subject from a point of view higher than that of the earlier course."

Géographie Économique de l'Afrique, l'Asie, l'Océanie et l'Amérique. Par Marcel Dubois. Paris : G. Masson, 1889. Pp. 730.

This is one of M. Dubois' series of geographical text-books, and gives a fair account of the main features of the continents treated of. The elements of economic, or commercial, geography are skilfully handled, and combined in such a manner as to convey a vivid and truthful idea of each country. The want of an index is to be regretted, and also the absence of maps or diagrams ; but the latter probably appears a more serious want than it really is, on account of the many cheap and excellent atlases that have recently been published in France. Summaries of the physical, political, and commercial condition of each continent form a special and valuable feature of the book.

English Rediscovery and Colonisation of America. By John B. and Marie A. Shipley. London : Elliot Stock ; not dated. Pp. xvi + 151.

Enthusiasts are always interesting until they become bores. Mr. and Mrs. Shipley are fortunately still in the earlier stages, and not yet soured by want of appreciation. Their themes are the sacredness of historic truth, the folly of the people of the United States in worshipping the shadow of 1492 as the date of the discovery of their continent by Europeans, and the vast importance of holding a

Viking Exhibition instead of a World's Fair. They show how Columbus's voyage was not, as many suppose, the splendid meteoric outburst of faith in the existence of a New World, but the natural following out of the course of exploration which had before brought the Norsemen to Vinland, and later led Cabot and Cabral to the shores of the new continent. Only, when the Icelanders made their discovery, the internal affairs of Europe and the absorbing interest of the crusades diverted interest from the far North-West; while Columbus and his immediate followers succeeded the great awakening of the mind and enterprise of Europe. So far as the book is designed to affect the expressions of American sentiment by holding or refraining from Exhibitions, it is without interest to readers in this country.

Meyers Konversations-Lexikon. Siebzehnter Band. Leipzig und Wien. Verlag des Bibliographischen Instituts, 1890. Pp. 1059.

This volume is the last of the fourth edition of this work. It contains supplementary articles extending over the whole alphabet, some entirely new, some bringing up to date articles that already have a place in the body of the work; a good index to subjects that have not been treated of under their own names, but are noticed in cognate articles; a complete list of the illustrations throughout the seventeen volumes; a list of the maps, and key-maps to the whole work. We congratulate the publishers on having brought to a successful termination a most valuable undertaking. An annual supplementary volume is promised.

The Trees of North-Eastern America. Illustrations from Original Sketches. By Charles S. Newhall. New York and London: G. N. Putman's Sons, 1890.

This work is written in a popular form, and is intended to describe a tree by means of illustrations, showing in outline the form of the leaf and print. It includes all the native trees of Canada, the Northern United States, and the Mississippi River. Both the popular and scientific names are given, as well as the geographical distribution. The illustrations are carefully executed, and the descriptions are such that any one may understand them, although destitute of botanical knowledge.

The Antiquities of Tennessee and the Adjacent States, and the State of Aboriginal Society in the Scale of Civilisation represented by them. By Gates P. Thruston. Pp. xv+369. 17 Plates and 246 Cuts. Index. *Price* 4 *dollars.* Cincinnati: Robert Clarke and Co., 1890.

The Antiquities of the State of Ohio. By Henry A. Shepherd. Pp. vi+139. Maps, Plans, Illustrations. *Price* 2 *dollars.* Same Publishers.

Fort Ancient, Ohio. By Warren K. Moorehead. Pp. xii+129. 2 Maps, 35 Phototypes. *Price* 2 *dollars.* Same Publishers.

This somewhat lengthy list of titles has the merit of leaving the reviewer comparatively little to say. Of the three works which Messrs. Clarke and Co. have been good enough to forward to us, the first is considerably the most important. It represents the honest attempt of a scholarly archæologist, whose extensive knowledge of his subject at once inspires him with caution and his reader with confidence, to determine the condition of aboriginal society in the Mississippi Valley in the prehistoric period represented by the ancient monuments and remains discovered in Tennessee and the adjacent States. The genuineness of the new and original specimens presented—many of them from a cemetery near Nashville, discovered and explored in 1888—is guaranteed by the writer; and, as regards the

entire subject, it may be added that he appears to have no theory to advocate, but mainly to have endeavoured to state facts. The book, however—the illustrations as well as the letterpress—presents unmistakable evidences of intercourse and relationship, more or less intimate, between the aborigines of the Mississippi Valley and the ancient peoples of Mexico and of the pueblo districts. If only for the sake of these illustrations, Mr. Thruston's handsome volume would be worth the attention of all students who are interested in American archæology; but, in addition to these, his well-written series of historical and ethnological sketches will be found amply to repay perusal.

The two other works, though of some value, may be more briefly noticed. Mr. Shepherd's book is reprinted from his *History of Ohio*, and indeed contains, in an introductory chapter, a general description of the State, which some of our readers may find serviceable. It must be noted, however, that in the statistical portions it unfortunately is already out of date: that is the penalty of committing oneself to figures in dealing with a country so bent on growing and developing as the United States. But so far as concerns the descriptions of the works of the Mound-Builders, the book, which is written in an easy, popular style, will be found both comprehensive and careful.

Mr. Moorehead's monograph deals with one great earthwork in Warren county, Ohio, overlooking the Little Miami River. It is a structure of considerable interest; certainly a fortified place, and not built for religious purposes—though whether it represents a fortified village site or merely a fort, in which about 35,000 people could take refuge, it is impossible to ascertain. The explorer, who has done his work very carefully, was fortunate in the assistance he received, especially from the farmers on whose lands he worked, and whose corn-fields and pasture-lands he was permitted to excavate to his heart's content. Of one he writes, with justifiable gratitude:—"The stone pavement we uncovered lies under his house, and in his front-yard, yet he made no objections to our digging a large hole in the sod and flower-beds in order that we might examine it." *O, si sic omnes!* Would that some of the enlightened spirit of the Ohio granger could be transferred into the suspicious souls of the *fellahin*, for instance!

NEW MAPS.

EUROPE.

EUROPA, Jahreszeitliche Verteilung der Niederschläge in ——. West-Asien und Nord-Afrika. Von A. Supan. 4 Karten.
Petermann's Geographische Mitteilungen, Jahrgang, 1890, *Tafel* 21.
Gotha: Justus Perthes.

SCOTLAND, Bartholomew's Reduced Ordnance Survey of ——. Sheet 17: Aberdeen and Deeside. Sheet 20: Central Ross-shire. For Tourist and Cyclists. *Price* 1*s. each.* *John Bartholomew & Co., The Edinburgh Geographical Institute, Park Road, Edinburgh.*

LONDON, Reduced Ordnance Survey Map of the Environs of ——. By John Bartholomew, F.R.G.S. Scale, 1 : 126,720 or 2 miles to 1 inch. *Price* 1*s.*
London: John Walker & Co., Farringdon House, Warwick Lane, E.C.

BALTISCHEN SEENPLATTE, Das abflusslose Gebiet und die Wasserscheide auf der ——. Von Dr. K. Keilhack. Massstab, 1 : 850,000.
Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 4.

OBER-ITALIEN, Reisekarte von ——, und den benachbarten Gebieten von Frankreich und Oesterreich sowie dem grössten Theile der Schweiz. Bearbeitet von R. Leuzinger. Massstab, 1 : 900,000. *Zürich: J. Wuster & Co.*

MONTENEGRO, Dr. Oscar Baumann's Routen im Nördlichen ——. Nach den Aufnahmen des Reisenden construiert und gezeichnet von Carl Kandelsdorffer. Massstab, 1 : 150,000.

Mitteilungen der K. K. Geographischen Gesellschaft in Wien, 1891. *Band* 34, *No.* 1.

MITTEL-GRIECHENLAND, Geologische Uebersichtskarte von ——. Von Dr. A. Philippson. Massstab, 1 : 900,000.

Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1890. *Band* 25. *Tafel* 6. *Berlin: Dietrich Reimer.*

SCHWARZEN MEER, Uebersichtskarte der Tiefsee-Forschungen im ——. 1890. Massstab, 1 : 4,500,000.

Petermann's Geographische Mitteilungen, Jahrgang 1890, *Tafel* 3. *Gotha: Justus Perthes.*

ASIA.

INDIA, Thacker's reduced Survey Map of ——. By J. G. Bartholomew, F.R.G.S. Scale, 1 inch = 70 English miles; or 1 : 4,435,200. 1891.

Calcutta: Thacker, Spink & Co. Bombay: Thacker & Co. London: W. Thacker & Co.

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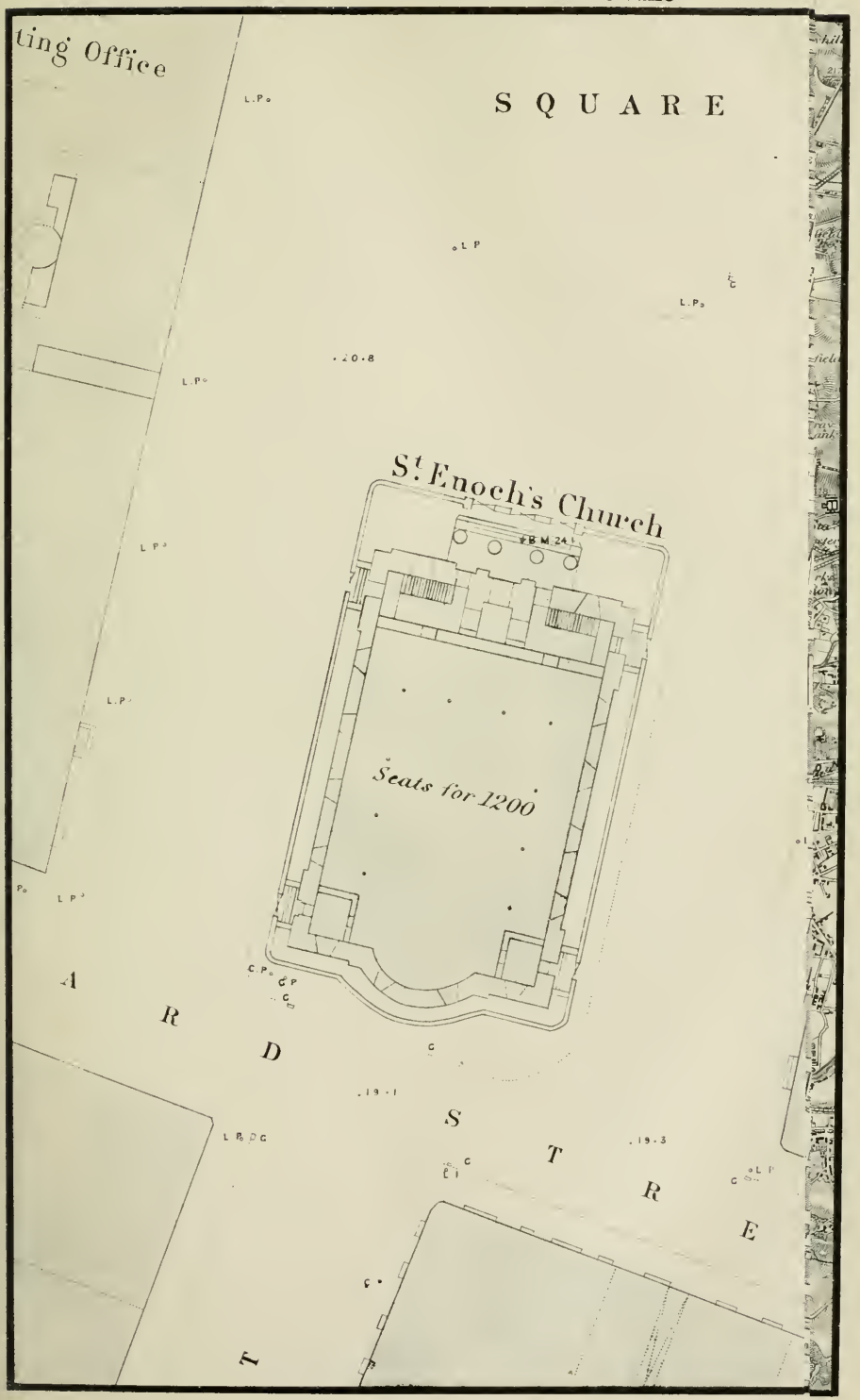
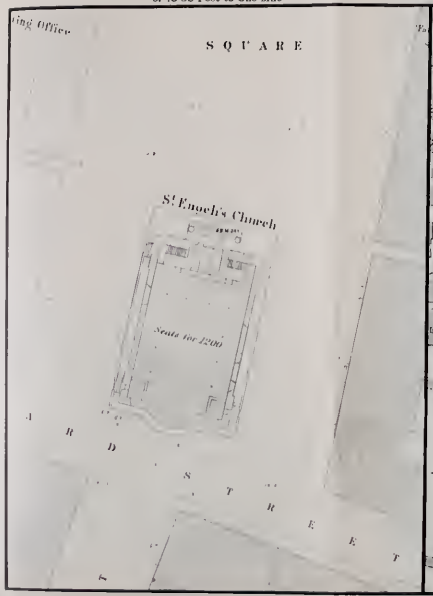
Scale—1 : 500,
or 10·56 Feet to One Mile.



Actual Examples of Various Scales of the Ordnance Survey Maps

In illustration of Sir Charles Wilson's Paper.

Scale—1 : 500,
or 10·56 Feet to One Mile



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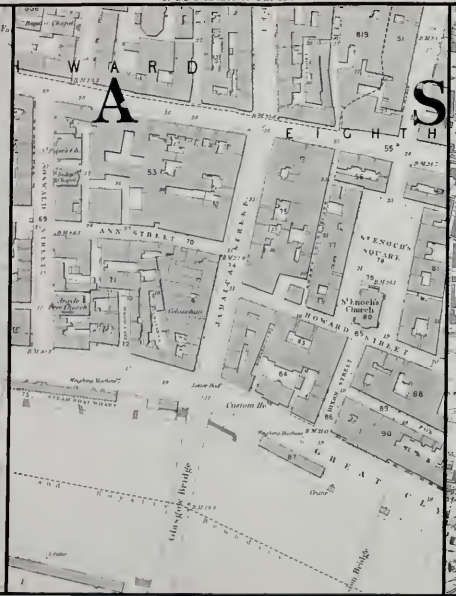
or 25·3 Inches to One Mile



Scale—1 : 10,560,
or Six Inches to One Mile

Scale—1 : 63,360,
or One Inch to One Mile

EACH OF THE CUTTINGS INCLUDES ST ENOCH'S CHURCH, GLASGOW. THEY ARE ARRANGED IN PROGRESSIVE ORDER.

Scottish Geographical Magazine 1891

THE SCOTTISH
GEOGRAPHICAL
MAGAZINE.

BRITISH CIVILISATION AND INFLUENCE IN ASIA.

(*Read at Meetings of Society in Edinburgh, Glasgow, Dundee, and Aberdeen, May* 1891.)

By Arminius Vambéry,

Hon. Corr. Member, Royal Scottish Geographical Society.

I must begin by asking your indulgence for introducing before this Geographical Society—which, in spite of its youth, has already deservedly gained a name and a reputation—a subject of purely ethnographical, or, properly speaking, of ethical significance. Geography and ethnography are very closely related to one another, and if, as has been so often asserted, every Briton should regard Geography as a national study, I venture to assert that a similar position might be ascribed to ethnography. Assuming that every citizen of this country is entitled to look upon our Earth as upon his greater home, we may reasonably conclude that every Briton should consider every man, irrespective of colour, creed, and race, as a fellow-citizen, whose welfare and ethical development have been intrusted to him by Providence. But by concerning ourselves with others, we require to gain accurate knowledge of their individual characteristics, their physical and moral relationships, as well as their inclinations and aversions: for it is only in this manner and through these channels that we can hope to convey our ideal, which we deem superior to their own. It is, moreover, only in this way that we may, possibly, succeed in raising our fellow-men from the dust of slavery and of saving them from abject darkness. If, therefore, the accurate knowledge of mankind in different climes be taken as an unavoidable postulate of successful civilising influence, we cannot lose sight of the power and aptitude of the people we wish to befriend. We require to examine and to know the ways and means, the

methods and manners, of the nations who have distinguished themselves as the torch-bearers of our culture in distant regions; for it is only by carefully balancing their *posse* and *velle* that we can prognosticate the usefulness of their work, as well as the future of the semi-civilised nations subject to them or their influence.

It is an investigation of this kind that I propose to make, with your kind permission, in reference to the civilising influence of Great Britain in foreign regions. It is very natural that, owing to the limited sphere of my knowledge, I should restrict myself to Asia,—a region to which the adventurous spirit and commercial enterprise of the British have been attracted for only two centuries, but in which, nevertheless, so many extraordinary changes and phenomenal sights are now apparent that even this short space of time entitles us to draw certain detailed conclusions in regard to them.

In speaking of Great Britain's action in Asia we have to distinguish between two very different methods and phases. First, we may consider those countries in which Great Britain did not arrive as a conqueror, but as a friend and well-wisher, or as a protector of her own subjects, and where her *rôle*, exposed to the varying influence of political events and lacking continuity, had only the chance of acquiring a temporary field of action. To these countries belong Turkey and Persia on the one hand, and China and Japan on the other.

In Turkey, Great Britain has enacted in the past century the *rôle* of a strictly commercial State—of a State upon whom the rulers of the country looked with more indifference than upon France, Austria, and Russia, who, in their quality of the powerful and armed representatives of Christian Europe, were mostly antagonistic to the Crescent. It is only from the time when the East India Trading Company succeeded in overthrowing the thrones of the Hindu princes, and when the power of the Great Mogul, who enjoyed great prestige on the shores of the Bosporus, was rudely shaken and began to totter—it was but then, I say, that the Sultan Khalif, the spiritual head of Islam, began to turn his eyes towards the island-country in the north-west of Europe, and the reputation of Great Britain began gradually to increase.

Towards the end of the eighteenth century Selim III. sent Vassif Efendi as his extraordinary ambassador to the Court of St. James's. The latter was a very intelligent Turk, whose report on the country and people of Great Britain was full of praise, and who, after returning home, compiled a very good geographical atlas in Turkish, based on English maps. The victory of British arms over the "great Corsican" very naturally enhanced this respect and consideration for the *Inghiliz*, not only at the central seat on the Bosporus, but over the whole Ottoman Empire in three parts of the world. Eclipsing the mythical personality of Bonaparte, it raised the name of Britain, in the first decades of the present century, to a much higher level than is generally imagined. In consequence of ephemeral political incidents, this current of sympathy grew sometimes weaker, sometimes stronger; but the Exhibition of 1851 decidedly augmented the prestige of Great Britain. A book of travels from the pen of an Osmanli, then residing in London, is overflowing with

praise and admiration for the order, cleanliness, humanity, charity, and wealth of the British people. That the Crimean War achieved most for the enhancement of this respect and consideration need hardly be said. The fraternity-in-arms brought *Jonny*—as the Turks then called "Tommy Atkins"—into such great prominence, that it entailed disrespect for *Didon*—as the Turks used to call the Frenchman. When Lord Stratford Canning in 1857 asked the Porte for permission to recruit soldiers for India, it naturally resulted that the Chief of Islam granted permission to collect auxiliary forces among his own Mohammedan subjects to quell a Mohammedan rebellion against a Christian ruler in the Far East.

In Persia, where Britain had extensive commercial relations as early as the seventeenth century, and whose king (Abbas the Great) manifested such an affection for Shirley that he stood godfather to the newly-born child of that Christian—in Persia, British influence was at first, much the same as in Turkey, subject to political events. Until the end of the eighteenth century, British merchants had to face the rivalry of the Dutch and Portuguese; and, like the Sultans of Turkey, the Shahs of Persia were attracted by the significance and importance of the seafaring and eminently commercial Christian *Ferenghis*, simply through the continually increasing and fascinating achievements of British arms in India. A Persian poet at the beginning of this century (Mahomed Khan Kadjar) mentions as a great wonder how a handful of daring *Ferenghi* merchants, holding the sword in one hand and the purse in the other, had subdued the mighty and rich Hindustan, and, what is still more miraculous, that they governed that vast country with firmness and justice, and eclipsed the rules of Timur, Baber, and Nadir. Orientals have always shown a marked susceptibility to great and phenomenal deeds, and, as their admiration for the heroism and adroitness of the Britons in India took hold of their minds, so also had the adventurous career of Napoleon worked its particular spell. Small wonder, then, that admiration for the rising and powerful West was divided between Frenchmen and Britons, and the consequence was that Malcolm and Joubert enjoyed alternate successes at the Court of Teheran. A little later, Russia stepped into the place of their French rival, and, in spite of the Persians fearing to show preference, and anxiously exhibiting strict neutrality, yet sharper eyes will easily discover predominating British sympathies in the present Kadjar ruler, and the ill-hidden desire to be led by Britain in the modern methods of civilisation.

With regard to Eastern, viz. Buddhistic, Asia, the struggle against blind self-conceit, ridiculous self-glorification, and deeply-rooted prejudices was much greater and more difficult than in Mohammedan Asia. What Great Britain, together with America, has accomplished in Japan, is certainly next to a miracle. Fully admitting the native talent and aptitude of the Japanese and their prince, nobody will deny that a gifted pupil has met with a gifted teacher, and that it is only the happy co-operation of these agents that could produce the wonder we now observe in Nipon. We see here a people of Turanian extraction, shut out from the rest of the world for thousands of years, accomplishing in decades a work that engaged us for several centuries. Reforms have been introduced in the

various branches of public and private life, laws and institutions have been created, the advanced liberal spirit of which may be justly envied by many nations of the Christian West; while trade and industry have progressed in an unparalleled degree. The English language is predominant at the Court and in aristocratic society. The phenomenal result of this very brief tuition entirely overthrows our old theories of the effeteness, rigid conservatism, and sloth of Orientals in general. Japan—which may be aptly called the Great Britain of Eastern Asia—must certainly be regarded as exceptional, for in China, where British civilising efforts, British trade, and British arms have also been active, the national self-conceit and blindness continue, nevertheless, in stubborn opposition against all foreign influence. But in spite of this, we notice that the indomitable zeal of foreign reformers is slowly and gradually permeating the thick crust of Chinese obstinacy; and there can be no doubt that all the reforms hitherto introduced into the Celestial Empire bear a distinct British stamp, and that, while other European nations have succeeded only in scratching the surface, the British and Americans have left deep and indelible traces.

In turning from spheres of indirect influence to those countries which form an integral portion of the British Empire, our attention is claimed, in the first place, by India, where Great Britain has slowly prepared a field for her activity, free from outside interference in her schemes of reform. This work of consolidation, these reforms and innovations, have been effected in India with a firm hand and by carefully-matured measures; and the results of one century's work are apparent in the growth of carefully sown seed, which cannot fail to elicit the admiration of Orientalists. But it does not surprise those who know and thoroughly appreciate the spirit of liberty, justice, and humanity of the Anglo-Saxon race.

It is not my task to portray the success of Britain's civilising activity in India, even in the faintest outline. This picture is sufficiently well known to you; and I disclaim the desire to "carry coals to Newcastle," or owls to Athens. I beg leave, rather, to call your attention to the hitherto insufficiently estimated—nay, even sometimes under-rated—struggle which the representatives of modern civilisation in the Old World have had to carry on, and the war they have had and still have to wage against the superstitions, prejudices, and the thoroughly Oriental mode of thought and action of that motley ethnical group formed by the inhabitants of India. It is not generally known that all the virtues and vices, all the advantages and disadvantages, which we admire or abhor in the western half of Asia, are all derived from India, and have spread in a westerly direction—over Persia, Syria, and Asia Minor. Extreme religious fanaticism, blind fatalism, coarse tyranny, cold indifference, ill-conceived humanitarian views, and many other peculiarities—too well known to students of Asia—have, from time immemorial, been found on the banks of the Indus and the Ganges in a more genuine and less adulterated form than in the empires of the Khosroes and Khalifs, or in the Mohammedan countries of to-day. In spite of the barriers raised up by younger religions this perversion of ideas has migrated from the East to the West, and can separately and conjointly be clearly

proved to exist in all the details of life as well as in the thoughts, tastes, and ethics of men in Western Asia. When, during my wanderings in Central Asia, I searched after the causes and origin of one or other of the more striking anomalies of Eastern life, I most frequently traced their home to India.

That the actual rulers of Hindustan have succeeded, in despite of the immense contrast existing between East and West, to raise that wonderful structure of Western culture in Asia, and that they were able to divert the thoroughly Asiatic mind of the Hindus into grooves of European thought—nay, into the British manner of thought and action—is a phenomenon quite unparalleled in the history of mankind, a feat which will for ever be admired by friends and enemies alike, and one which elicited the following remark from a great German statesman: "If the British lose Shakespeare and Milton, and every other writer who has made his name illustrious throughout the world, the justice and ability with which they have administered India will be an imperishable memorial of their nation." Yes, an imperishable memorial is quite the right expression, if we recall the facts that India has been for the first time united under *one* rule, after thousands of years of tyranny and anarchy, and that the country enjoys, now for the *first time*, a settled government anxious to save its subjects from the former terrible evils of famine, epidemics, and internecine wars. The Government of India has abolished many revolting practices and customs, and is now honestly bent on introducing humanitarian and educative institutions, by which millions of Asiatics will share in the blessings of enlightenment, of peace, and of a just and equitable rule.

But, as I have said, it is not my task to sing to you hymns of praise, nor to exalt your national pride. As an ethnologist, having a special interest in the destiny of Humanity in Asia, I would rather investigate the causes of this remarkable success, and indicate the ways and means which appear to me necessary—nay, unavoidable—for the completion of this great work. I shall, at the same time, with your kind permission, refer also to the shortcomings and mistakes that have been committed hitherto.

The fact that Britons—these genuine representatives of Western Civilisation—were, and are, successful in their work of reform in Asia, must by no means be regarded as an inexplicable wonder. Like the rest of mortals, Britons do not possess superhuman or miraculous powers; they do not enjoy any unknown charms: all their astounding success is simply the outcome of those ethical, political, and social qualities through which they have distanced other European nations, and by which they very naturally overawe Asiatics. The eminently strong individuality, fostered by a truly liberal political constitution and by the spirit of freedom, has at all times encouraged the Briton's spirit of enterprise; it has stimulated him to acts of daring, steeled his nerves, and made him persevering and courageous under the most critical circumstances or great dangers. In consequence of these advantages he has become a pioneer and a conqueror, retaining, in distant countries and under other climes, those principles of freedom and frankness and those notions of

justice and humanity which he imbibed with his mother's milk, and which, ultimately, could not but fascinate the eyes and conquer the heart of the most obdurate Asiatic. Superficial critics of the East have often expressed the view that the Asiatic, because he is indolent, lazy, and a fatalist, will never appreciate manliness, tenacity of purpose, and strength of will, and that, having served as a blind tool of despotism and tyranny, he will never be able to acquire a taste for political freedom and liberty of action. Both of these views are utterly false and unfounded. The tenacity, perseverance, and indefatigability of Britons have always deeply impressed the Asiatic; and I have had the opportunity of witnessing more than one Turk, Persian, or Afghan, who, in spite of being impregnated with the ideas of the Mohammedan Nirvana, began by expressing his amazement at the unremitting activity of the British *Ferenghis*, and concluded with the remark: "Verily these *Ferenghis* are a most remarkable people!" Similarly with the ideas of political liberty, which seem to them odd, and are even incomprehensible. All the notions and ideas which the semi-civilised Western Asiatics have hitherto acquired of the liberal spirit of Europe are traceable to their relations with Anglo-Saxons and to their acquaintance with the institutions of Great Britain. Nothing proves better the aptitude and taste of Asiatics for our liberal institutions than the somewhat sudden awakening of the native press in India, and the premature political aspirations of the Bengali Baboos, and of the *jeune Turquie*. Liberty is a golden fruit towards which mankind, in the state of juvenescence, eagerly stretches forth a hand; and, if we read from time to time opinions to the contrary, we may be sure that they emanate either from the ruling classes of Asiatics, whose private interests are antagonistic to our modern institutions, or from Europeans insufficiently acquainted with the demands and acquirements of Orientals.

And what must I say of those innovations and reforms through which Asiatics have become acquainted with the spirit of humanity and toleration expressed in Western culture? The feeling of utter surprise and astonishment which animates the Turk, Arab, and Persian on associating with the Christian missionary, who cures him of disease, who teaches his children, and who behaves as a true friend and adviser—the same feeling must agitate the breast of the Hindu on witnessing the various humanitarian institutions created by his foreign ruler, whom he at one time hated and abhorred with all the fanaticism and exclusiveness of his social and religious principles. It is very natural that the abolition of "Suttee," infanticide, and of other practices, or the recently-introduced Bill regulating the Age of Consent, must inevitably rouse a strong feeling of indignation and aversion on the part of rigidly conservative natives. But what are these unpalatable measures in comparison with the blessings derived from the 133,410 schools, having 3,476,194 scholars, among whom we find nearly 30,000 girl-students? The complaint that the foreign ruler has penetrated into the sanctuary of family-life must become dumb in view of the noble services rendered by a Christian like Lady Dufferin. You are doubtless aware of the fact that, of the so-called "Lady Dufferin Fund," £120,000 sterling have been spent in recent years on buildings

alone, and that 411,000 Indian women have received medical assistance in 38 hospitals. Well, this charitable fund, which, I am sorry to say, did not meet in this country with the attention it deserved—for the British branch is sadly lacking in funds—has already been the means of opening a school of medicine for Hindu women, who will consequently devote themselves to the study of anatomy. Anatomy and Asiatic women!—that is the most extraordinary association of ideas one ever could have imagined.

If I were to further dilate on reforms in India, I could go on for hours and hours recounting those surprising measures. They unmistakably prove that our old mother, Asia, is accessible to reforms, and that your nation is in the best way to accomplish that which sceptics still believe unfeasible. But, in venturing to ventilate the question, I think it would be more appropriate, and would better answer our purpose, if we were to consider, in the first place, its two leading features :—*First*, the time necessary for the realisation of the object; and, *second*, the means to be applied—simultaneously also, the mistakes committed hitherto in the process of this work of civilisation.

I refer to the question of time necessary for the completion of the task for the simple reason that optimists, as well as pessimists, generally shoot beyond the mark. The fallacy of pessimists has been splendidly proved, and their disbelief in a coming success is crushingly contradicted, by the array of conspicuous evidences, and by the eloquent argument of facts. But the optimists, too, labour under a misconception in supposing that we are on the eve of an entire and radical change in India, and that the millions of Asiatics will turn suddenly, like *Deus ex machinâ*, into thorough Europeans. The fact that nearly one million of natives speak to-day the language of Shakespeare and Milton, and that hundreds of thousands are to-day pursuing the various branches of European science and art—this fact alone can hardly be adduced as an argument in favour of an over-sanguine hope in the sudden change of an Asiatic community of 260 millions of men. The transformation in culture of an Asiatic people can only slowly—very slowly—be effected. This we are taught by the example of Turkey, where the upper classes, educated in the ways of modern science, have fairly adapted themselves to the exigencies of culture of the nineteenth century; whilst the mass of the natives still clings, and will long cling, to its ideals of Eastern life. In India the sun of modern culture has risen with a more intense light; but the rays illumine, up to the present, only the heads of society, and are very far from penetrating the masses. The time when Britons will become superfluous in their quality as a civilising agency is yet far distant: and the opinion of those who believe that the people of India will soon be enabled to continue unaided the work of civilisation is hardly worth refutation. I believe, on the contrary, that the great task is only now beginning. Up to the present the way has been only paved and the means prepared; and it is for this reason that the ethnographer, interested in the destinies of the people of Asia, may be pardoned if his attention be not merely absorbed by the results hitherto obtained, but if, for the sake of future progress, he point also to the shortcomings and

mistakes he has hitherto noticed in the process of civilisation. I am obliged to dwell on this unpleasant topic, for the simple reason of my being erroneously called an Anglomaniac, a writer who never finds fault with the doings of your nation in Asia—a supposition against which I have to lodge a protest: for every mania, whether it be Anglomania, Russomania, or Turcomania, is decidedly a defect of judgment due to mental aberration; and, secondly, because criticism is better suited to sincere friendship than unconditional flattery.

Among the various faults which can be ascribed to the inhabitants of this country, in regard to their task and duty in Asia, I would mention, in the first place, the surprising indifference exhibited in Asiatic matters in general, and particularly in the relations of this country with the East. Indifference is the mother of ignorance and of prejudice; hence the curious and saddening fact, that not only the lower but also the middle classes of Great Britain show less interest in, and are less acquainted with, the various countries and nations of the Old World than many Continental peoples who do not own a rood of territory, and who have not got a single farthing invested in Eastern regions. During the last 25 years of my connection with this country, I have had the good fortune to lecture in more than twenty towns, and have had the chance of coming in contact with great merchants, manufacturers, and artists; and I have really been quite struck by the indifference to, and want of information concerning, matters connected with the East. I have frequently put to myself this question: "Are these the citizens of the country that has founded a great empire in Asia and has come forward as the glorious representative of our Western culture?" Verily, my astonishment had no limits, and I could not help saying to myself: "How much greater would have been the merits of Britain, how much more significant would have been the results of her often-proved heroism and rare energy, if the care and interest of those who remained at home had been adequate to the noble task and zeal of their brethren in distant lands?" Yes; this remarkable anomaly must give way, and the sooner the better: for not Russia, but Great Britain, is the greatest European Power in Asia, considering that real influence and power is not based on so many hundreds of thousands of square miles of vacant territory, but on the millions of laborious and peace-loving inhabitants. As a consequence of this deplorable indifference, I have to remark on the complete reserve, coldness, and haughtiness which the British trader, soldier, and civil officer too frequently exhibit in their intercourse with Asiatics—a mistake through which their mutual relations and good understanding are rendered far more difficult than in the case between Russians and their Asiatic subjects. I fully admit that for the Briton of a higher education, and particularly for those who come from the Colleges of Eton and Harrow, and from the Universities of Oxford and Cambridge, who enter upon the field of Asiatic enterprise, the intimate connection and intercourse with the man reared in Eastern habits and customs will entail greater self-denial and heavier sacrifices than with the semi-Asiatic Russian, who is separated by a very thin partition-wall from the native of Asia. It would be not only useless but wrong to disregard this national error,

to which must be ascribed the unmistakable decrease of British influence in those parts of Asia where your countrymen have to face the competition of other more pliant and less rigid representatives of the West, and where British manufactures, in spite of their unquestionable superiority, have lost more than one market. The remarks of a distinguished lecturer in this place, last December, regarding British trade with China, refer, I am sorry to say, not only to the whole line of Russian advance, from Eastern Turkistan to Batum, but also to many other points in European and Asiatic Turkey, as well as to Syria and the north of Persia. If you compare former statistical data with those more recent, you will find that the sale of British chintzes, cloth, trinkets, and iron-wares has not by any means increased in proportion to their enhanced consumption by the natives; but, on the contrary, it has fallen off.

Well, I believe a nation like yours ought never to suffer such retrogression, and still less ought Great Britain to lose a market, considering that every new market becomes a nucleus of our modern civilisation, and every bale of goods is a valiant apostle of our culture, by which, on the one hand, the sacred cause of Humanity is advanced, and, on the other, the consolidation of this Empire, the interest of which you all have at heart, is promoted. I repeat, therefore, the old indifference must entirely cease. We may notice that, in the absence of some stirring event, entire weeks and months pass without the English daily papers or periodicals consecrating their columns to the discussion of Asiatic topics; and this is not only the case at the present time, when the public is smitten with African fever, but it has always been the same. Africa is a region with a distant and problematical future. The denizen of the Dark Continent has yet to be taught the necessity of dressing, of building a house, and of leading an existence worthy of man; whereas in Asia we are attracted by the conditions of an old culture, and by a society in need, and capable, of reforms—as proved by the examples of India and Japan—and where ample scope is offered for the spirit of enterprise. But in order to accomplish this task we ought not to omit applying the necessary means. Ethnography (I mean a thorough knowledge of the customs and habits, of the history and religion, and of the various peoples under the British Crown or British protection) is a far more potent charm for the acquisition of confidence and sympathy than the thunder-tramp of mighty armies. Still less indispensable is a knowledge of native languages. You will pardon me when, encouraged by many years' experience, and by some acquaintance with the schools of this country, I venture to say that the study of ethnography and of the languages of Asia is sadly neglected by you, and that Germany, Russia, and Austria-Hungary bestow greater care on the cultivation of these branches of knowledge than does Great Britain. Towards the end of the last, and in the first decades of the present, century, when this country was laying the foundations of her actual power and influence in Asia, British scholars had taken the lead in the study of Eastern languages and archæology. To-day we could hardly make such an assertion, although the influence of Britain has since grown ten-fold stronger, and scientific interest ought to have increased in due proportion. It has often been a reproach to the Government, that they do nothing to further the study of Oriental

languages, whereas other governments, less interested in Asia, have spent annually considerable sums towards this end, and employ only those officers who are thoroughly versed in the languages of the respective countries. Well, I would not, and I could not, whitewash the Government of this country, for they are guilty of great neglect. But, on the other hand, I venture to presume that the inhabitants of these islands, unlike Continental peoples, are in the habit of helping themselves, on their own initiative, and that they do not like to implore the assistance of the State in everything. If so many, or perhaps most, of the charitable institutions and colleges have been founded by private individuals, and are kept up by Society, why should not this be the case with schools for Oriental languages? There are the Missionary Societies and Chambers of Commerce, which might serve as intermediaries for the advancement of Oriental teaching—I mean to say, for practical instruction in Eastern idioms. It need hardly be added that a missionary well acquainted with the language will more readily find his way to the heart of the Asiatic, and that the merchant, if informed of the tastes and wants of foreign peoples, will enjoy a larger sale and a wider field for his wares.

This shortcoming has often been imputed to the supposed defective linguistic ability of Britons in general, of whom it is said, that they are not so prone and gifted to acquire the colloquial part of foreign tongues as many other foreign nationalities. Well, this is one of the greatest mistakes. Linguists of my personal acquaintance, such as the late Lord Strangford (for Turkish), the late Sir Richard Burton and the late Professor Palmer (for Arabic); or scholars like Sir James Redhouse, Sir Henry Rawlinson, Sir William White, and many others, bear evidence of the brilliant linguistic capacity of the British; and, in fact, nothing would be easier than to recruit in this island a goodly number of Oriental linguists for employment in various Asiatic countries.

In a word, it is time that the coldness and indifference with which events in Asia are viewed by a large majority of Britons should cease: for every patriotic man ought to be imbued with the conviction that the political greatness and welfare of the United Kingdom depends mainly, if not exclusively, on its position in Asia. There are people among whom the opinion prevails that Great Britain, having no colonies, but only possessions, in the East, is merely a guest in Asia, and that, owing to this temporary character of her *rôle*, she cannot engage in far-reaching enterprises. Such, however, is the opinion only of the envious and of the enemies of this country, with whom the wish is father to the thought, and who do not possess sufficiently deep insight into the social relations between the East and the West. My own unpretentious opinion is quite to the contrary. A long theoretical and practical study of the question has fully convinced me that it would be vain for the Asiatic to attempt to withdraw from the transmuting influence of the materially and morally superior West; that our intervention has become an imperious necessity, from a strictly humanitarian point of view; and that, finally, this tutorship were in the first instance best undertaken by Great Britain, as being the country best qualified to leave a salutary impression on the minds of Asiatics,—which has been proved by the examples of India and Japan.

THE LAKE REGION OF CENTRAL AFRICA: A CONTRIBUTION TO THE HISTORY OF AFRICAN CARTOGRAPHY.

By E. G. Ravenstein.

(*Read at a Meeting of the Society, Glasgow, 21st November* 1890.)

(*With Maps.*)[1]

A short time ago I received a letter from a friend in Liverpool, who had seen an old globe in a Swedish museum, which, to his utter astonishment, depicted Central Africa as a region abounding in lakes. As this globe dated back to the seventeenth century, my friend, not being a professed geographer, quite naturally accepted the presence of these lakes as proof of actual discovery, and concluded that our modern explorers could therefore be credited at most with having re-discovered lakes, known long since, but erased from modern maps by a younger generation of cartographers infected with the sceptical spirit of their age and generation.

When your Society honoured me with an invitation to lecture before you, I thought that this subject might prove more especially attractive to a Glasgow audience, for your city is not only closely connected with Livingstone, who has done great things towards an elucidation of the hydrographical features of Central Africa; it is also the headquarters of an African Lakes Company, which promises so much towards throwing open the Dark Continent to commerce and civilisation.

I am quite aware that my subject is not a new one. Fully two centuries ago the learned Ludolphus, in his work on *Ethiopia* (1681), pointed out the errors of his predecessors, who, not content with retaining Ptolemy's two Nile lakes, had assigned to the great lake of Abyssinia a position which gave quite a distorted view of what was really known in their day. The contemporaries of Ludolphus took little heed of his criticisms, and it was only with Delisle and D'Anville that these gross blunders of an uncritical age disappeared from our maps.

Before Ptolemy.—Before proceeding to a consideration of Ptolemy's map, it may be worth while to indicate broadly the materials which were available when that great cartographer compiled his monumental work. In early times the communication between Egypt and Meroe, the great metropolis of Ethiopia, were frequent. Quite a host of travellers are known to have visited the city which was then the centre of a powerful empire. Philo furnished Eratosthenes with the latitude of Meroe; Dalion is reported to have travelled far beyond that city; Simonides, the younger, stayed five years there, and wrote a work on Ethiopia; Bion lived some time there; whilst two centurions, sent out by the Emperor Nero in quest of the sources of the Nile, are reported to have reached

[1] The maps accompanying this paper are reduced from some of the diagrams exhibited at the meeting.

extensive swamps, overgrown with rushes, which effectually put a stop to their further explorations. The coast of Eastern Africa was known as far south as Rhapta, an important emporium exporting ivory, rhinoceros horns, and tortoise-shell.

Unfortunately, with the exception of a "Periplus" of the Erythræan Sea, usually ascribed to Arrian, the reports of these travellers and explorers have only reached us in a fragmentary shape. Neither Strabo nor Pliny, to whom we are indebted for nearly all these fragments, have succeeded in reconciling the various authorities whom they were able to consult. The main facts, so far as they bear upon our subject, appear to be as follows:—

The Nile, below Meroe, or rather below its confluence with the Atbara, was known as Siris. Our Atbara was represented by the Astaboras, said to have its source in a lake, and asserted, by Artemidoros, to bifurcate, and to send one of its arms into the Red Sea. This supposed eastern arm of the Astaboras is undoubtedly the modern Wadi Baraka, which has, however, no connection whatever with the Atbara. The Blue Nile was known anciently as Astasobas, or Astosapes, that is, the river of Soba, or Sape, a town identical with Ptolemy's *Esar*, the ruins of which still exist above Khartum. The Astapus, lastly, was the river which flowed along the western side of Meroe; and when Strabo tells us that this river was called by some "Astasobas," he only gives expression to popular opinion, in accordance with which the "Blue Nile" was looked upon from the earliest times as the true head-stream of the Nile, the floods of which, produced by heavy rains in the mountains of Ethiopia, were the cause of Egypt's fertility. As to the White Nile, it must have been known, for we can scarcely doubt that it was this river which was explored by Nero's centurions; but its native name has not been placed on record, unless we suppose it to have been "Astapus." All these rivers are in a vague way supposed to have their sources in lakes, but the only lake mentioned by name is Strabo's *Psebo*, "above Meroe," which is usually identified with Lake Tsana, but may equally well be some other Abyssinian lake, such as Lake Haik.

Very little was known of the country just mentioned. In the time of the "Periplus" (100 A.D.) Greek merchants were in the habit of going from Adulis to a place called Koloe, an ivory mart, three days in the Interior, whence it was a five days' journey to the capital of the Auxumitae, our modern Axum. Koloe is represented by the modern village of Halai, at the edge of the plateau, and is referred to as Kole in ancient Ethiopian documents. Beyond Axum these adventurers crossed a river "Nile," in this instance clearly the upper Takazze, or Atbara, into a district called Cyeneum, which abounded in ivory. The mountains forming the eastern edge of Abyssinia are referred to by Agatharchides (116 B.C.) as the Pseboean mountains, a name recalling Strabo's *Lake Psebo*. The name of many tribes are mentioned. Of these I only need refer here to the Simbarri and Paluogges, because, owing to a similarity of name, they have been placed on the Upper Nile—quite erroneously, as I conceive—as a careful perusal of Pliny's work shows distinctly that they were supposed to dwell between the Blue Nile and the Abyssinian

mountains. As to the "Pygmies," first mentioned by Aristotle, and placed by Pliny, that indiscriminate compiler, in the "marshes in which the Nile rises," they were not believed in by Strabo, and have found no place upon Ptolemy's map.

The coast outside the Red Sea, as far as Rhapta, is described with considerable detail in the anonymous *Periplus of the Erythræan Sea*, already referred to. Its author, unfortunately, says nothing about the interior of the country. It is clear, however, that the ivory-hunters established on the Afer and Somal coasts proceeded some distance inland, for Artemidoros of Ephesus (100 B.C.) mentions a "salt sea" and a fresh-water lake inhabited by crocodiles and hippopotami, together with a river Isis, as existing in the Myrrh country, and tells us, moreover, that a river Nile rose farther to the east. It scarcely admits of doubt that the salt lake in question is identical with Lake Assal, at the back of the bay of Tajura; that the fresh-water lake still exists in Ausa; that the Isis is now known as Hawash, whilst the "Nile" is the upper Leopard River, which loses itself in a marsh, or lake, near the East Coast, not far from the mouth of the river Jub. Marinus of Tyre, the immediate predecessor of Ptolemy, confirms the existence of lakes near the East Coast of Africa, and one of these lakes he looked upon as the head of the Nile of Egypt. The maps and writings of Marinus have unfortunately been lost. All we know about them is derived from Ptolemy, who only refers to them for the purpose of subjecting them to a scathing criticism. The views of Marinus, however, appear to have influenced later writers, and more especially the Arabs.

PTOLEMY.—From what I have stated, it must be perfectly clear to you that the ancients, up to the days of Ptolemy, were absolutely ignorant of the fact that the main branch of the Nile rises in a vast lake lying under the Equator. The lakes vaguely referred to by them were evidently the lakes of Abyssinia or of the Maritime region of Eastern Africa. Ptolemy, however, with that uncompromising definitiveness almost inseparately connected with the mapping of geographical facts or hypotheses, derives the famous rivers from snow-clad mountains, and from two lakes which he places far to the south of the Equator.

When the existence of snow mountains and vast lakes in Equatorial East Africa first became known to us about half a century ago through inquiries instituted among the leaders of caravans who had visited the Interior, and when soon afterwards these mountains and lakes were actually found by European explorers to exist, geographers somewhat rashly saw in this a remarkable confirmation of Ptolemy's hypotheses. Dr. Beke, as early as 1846, looked for the "Mountains of the Moon" in Unyamwezi. Subsequently (1848) he assumed that they formed the eastern edge of the African plateau, and that the Nile had its sources on their inward slopes, a hypothesis on the strength of which he considered himself entitled to be looked upon as the "theoretical discoverer of the sources of the Nile." A few years afterwards (1861) he identified the Victoria Nyanza and the Tanganyika with Ptolemy's two Nile lakes. Sir R. Burton (1864) sought these Nile lakes in the Tanganyika, of which he himself was the discoverer, and in the Baringo, and he associated the

snow-clad Kilma-njaro with the Mountains of the Moon. After Baker's discovery of the Albert Nyanza, M. Berlioux (1874) identified that lake and the Victoria with Ptolemy's lakes, whilst Kenia and Kilima-njaro still represented the Mountains of the Moon. Still more recently, after the discovery of the snow-clad Ruwenzori, and the exploration of the Albert Edward, Mr. Stanley transferred Ptolemy's Lunar Mountains to that remote part of Africa, and this rather startling hypothesis has not been wanting supporters.

Almost the only modern critic who doubted Ptolemy's knowledge of Equatorial Africa has been Mr. W. D. Cooley (*Ptolemy and the Nile*, 1854). Mr. Cooley identifies the Astaboras with the Mareb, the Astapus with the Atbara, Strabo's Lake Psebo with Lake Tsana, and Ptolemy's Nile lakes with the marshes in which the Leopard or Haines River loses itself. Ptolemy, according to Mr. Cooley, knew nothing of the White Nile, whilst the sentence referring to the Mountains of the Moon "does not belong to the genuine text of his work."

After a careful study of the subject, I have arrived at conclusions identical, in several respects, with those put forward by Mr. Cooley. We cannot examine Ptolemy's map of the part in Africa here in question without perceiving that much information, which we know to have existed, and which must have been available at Alexandria, has not been utilised. Ptolemy does not appear to have consulted the anonymous *Periplus of the Erythræan* (witness his misplacements of Coloe and Menuthias); he knew nothing about the expedition which Nero sent to Meroe and the Upper Nile; nay, he cannot even have read such standard authors as Strabo and Pliny. On the other hand, his map embodies information not given by his predecessors, and most likely derived from the work of Marinus of Tyre; nor must we lose sight of the erroneous graduation adopted by the Alexandrian geographer, who assumed a degree of the Equator to measure 500 stades (or fifty geographical miles) instead of 600 stades. Wilberg and Cooley have sought to eliminate the errors arising from this mistake by overlaying Ptolemy's map with a corrected network of parallels and meridians. This proceeding, however, would have been admissible only if the whole of the map were based upon itinerary materials, not checked by occasional latitudes obtained by astronomical observations. Meroe, for instance, the latitude of which had been observed, occupies approximately its true position, whilst Adulis, which is dependent upon a dead-reckoning carried southward from Alexandria, is placed 3° 34′ too far to the south. An amended graduation would give to the latter very nearly its true place upon the map, but it would shift Meroe more than two degrees to the northward, and correct in no wise the latitudinal difference between the two places, which would still amount to 4° 45′, whilst in reality it does not reach 1° 45′. I have, therefore, discarded an amended graduation, but furnished Ptolemy's map with an amended scale instead, which enables us to measure the direct distances between places shown upon the map, quite irrespective of the degree-lines which cross it.

After these preliminary observations, I proceed to a more detailed examination of Ptolemy's map, and begin with Meroe, in order to identify,

as far as possible, the rivers and localities which have found a place upon it, and to ascertain whether there exists any connection between them and the Upper Nile as now known to us. The Astaboras, which joins the main Nile below Meroe, I do not hesitate to identify with our modern Atbara. The unnamed tributary of that river, which is shown on Ptolemy's map, but is not referred to in the text, may possibly be the Mareb, along the banks of which dwelt the Molibae. The Astapus is almost unanimously identified with the Blue Nile, and Lake Coloe, from which it issues, with Lake Tsana.[1] Such an identification, however, presents very considerable difficulties. The island of Meroe, according to Ptolemy, included also the country of the Sebridae or Sembritae, whose capital was Eser or Sape (Bion ap. Pliny, c. 35). The position of Sape has been satisfactorily ascertained, and the country of the Sembritae extended undoubtedly along the Blue Nile. As Ptolemy's "Astapus" enters the main Nile above Eser, we are bound to identify the latter, that is, the main Nile, with the modern Blue Nile, whilst the Astapus would be the Rahad or the Dender, which flow into that river from the Abyssinian highlands. Other features of Ptolemy's map favour the same hypothesis. The Ptomphanae, who, according to Pliny, had a dog for their king, must be looked for in Fazogl, where Brun-Rollet and Marno found customs surviving which explain the name given to this tribe by the ancients. The "Catadupi," or cataracts, which Ptolemy places on his main Nile, may possibly refer to the falls which the Abai forms after leaving Lake Tsana. As a matter of fact, all is confusion in this part of his map. Nor do we fare better if we approach Ptolemy's Astapus from the Red Sea. Three days from Adulis, so the *Periplus* tells us, we reach Coloe,—a name found on Ptolemy's map in quite a different position. Five days beyond Coloe we reach Axum, and still farther west we cross the "Nile,"—that is, the Astapus of Ptolemy's map, or our modern Takazze. Mr. Cooley, it will thus be seen, was justified in identifying the Astapus with the Atbara, for the Takazze is the Upper Atbara, and I quite agree with him when he identifies Ptolemy's Pylaei Montes, which lie beyond that river, with the snow-clad mountains of Semen. But if the Astapus is not the Blue Nile, Lake Coloe cannot possibly represent Lake Tsana, from which that river rises. Fortunately Ptolemy himself enables us to give that lake a more correct position than that assigned to it upon his map. He places Lake Coloe to the south of Gabartus Mons, and in the Myrrh country. Gabartus is readily identified with the Jabarta of the Arab geographers, said to extend from Zeila to Shoa. If Gabartus Mons be anywhere in Ifat, its position on Ptolemy's map is surprisingly correct, for he places it at a distance of 250 miles from Aualites (Zeila), the real distance being 225 miles. The lake is placed *south* of Gabartus Mons, and may possibly be the Zuway, which has, however, no connection whatever with the Nile. If we place the Coloe in the Myrrh region, which ncient authors unanimously describe as being situated around the head of the Gulf of Aden, it may be identical with one of the lakes at the back of Tajura Bay, in which case the river connected with it would be the

[1] De Barros, *Asia*, 1552, first identified Lake Coloe with the Barcena or Lake Tsana.

Hawash! Our result then is as follows:—Ptolemy's Astapus is the Upper Astaboras (Atbara)—that is, the Takazze—and is supposed to send an arm into the main Nile south of the country of the Sembritae, whilst communicating at the same time with Lake Zuway, or perhaps with the river Hawash. The confusion could not be greater. Any notion that Ptolemy heard of the existence of his "Nile Lakes" from Meroe must be abandoned.

Such knowledge, if ever he possessed it, can only have been obtained on the East Coast, and that only from caravans which traded between Rhapta, the great emporium of Azania, and the Interior. Rhapta, which derives its name from the sewed boats employed all along the coast of Eastern Africa, as also in the Red Sea, has been identified by various authorities with quite a number of places. De Barros (1552) and Dr. Vincent placed it at Kilwa; D'Anville and Dr. Beke at the mouth of the Lufiji; Dr. Berlioux (1870) at that of the Pangani; and Mr. Cooley (1854) at that of the Jub. Most authorities, however, agree that it should be looked for somewhere in the bay facing Zanzibar Island.

This view certainly derives confirmation from the statements made in the *Periplus*, as also from an inspection of Ptolemy's very imperfect map. As an instance of these imperfections, I may mention that Ptolemy tells us (I. 17) that Rhapta was on a river not far from the sea, and close to a promontory bearing the same name; whilst, on his map, Rhaptum promontory is situated a hundred miles to the south-east of the river, and the town stands 75 miles above its mouth. Loose or contradictory statements, such as these, unfortunately disfigure much of what Ptolemy tells us about the East Coast of Africa. I believe, however, that Bagamoyo or the village at the mouth of the Kingani may fairly be assumed to occupy the site of ancient Rhapta.

In adjusting the information given in the *Periplus* and by Ptolemy to a modern map, it is of importance that the positions of Aromata promontory and Zingis peninsula or Opone should be ascertained. As to the former, it is beyond a doubt our modern Cape Guardafui, although Ptolemy places it in lat. 6° N. on his map, and in 4° 15′, or 5° 41′ N. in his text (Books I. and VIII.); whilst its correct lat. is 11° 50′. It is equally certain that Zingis peninsula is represented by our modern Ras Hafun, whilst the village of that name represents Opone. The distance between Opone (Ras Hafun) and Bagamoyo, following the sinuosities of the coast and touching at Pemba, amounts to 1255 geographical miles. A voyage from Opone to Rhapta (Bagamoyo) occupied, according to the *Periplus*, 25 days, or rather "courses," a day's and a night's sail being reckoned as two "courses." A day's sail would thus have amounted to about 500 stades or 50 miles. This is a reasonable distance. Ptolemy, when discussing the distances given by Marinus, admits that 400 or 500 stades daily would be a fair average; whilst Dr. Krapf, who travelled in 1843-4 from Cape Guardafui to Zanzibar in native craft, spent 24 "courses" upon his voyage, his daily progress having varied between 25 and 66 miles, and averaged 55 miles. Theophilus, one of the mariners cited by Ptolemy, performed the voyage from Rhapta to Aromata in 20 days; whilst Diogenes, sailing in the opposite direction, did so in 25.

It is therefore with a considerable degree of confidence that we place the Apocopa Magna of the Periplus at Hopia, and Sarapion at Merka, whilst identifying the Pyralai islands, Menuthias, and Rhapta, respectively, with Manda, Pemba, and Bagamoyo.[1]

Ptolemy's map and text present far greater difficulties. According to the details given by him (I. 17), a voyage from Opone, or the Zingis promontory, to Rhapta occupied 24 "courses"; and as the development of his coast-line only amounts to 756 miles, each "course" would average only 30 miles. This distance, measured off on a modern map, would carry us no farther than the Wubushi or Durnford River, to the south of the Jub; and this induced Mr. Cooley (*Ptolemy and the Nile*, 1854) to assume the existence of two Rhaptas, that of Ptolemy on the river Jub, and that of the *Periplus* at Kilwa. It seems unlikely, however, that the Greeks should have bestowed the same name upon two ports lying on the same coast; and I am content to leave Rhapta somewhere on the coast facing Zanzibar Island, where nearly all authorities place it.

And now I come to the Nile lakes and the Mountains of the Moon. If Rhapta is now represented by Bagamoyo, these lakes and mountains should have been discovered in the positions assigned to them upon the map I place before you. Lakes have been discovered, but not in the absolute or relative positions which the Nile lakes occupy on Ptolemy's map; whilst as to a range of snow-clad Lunar Mountains, stretching for nine degrees from east to west, it would be difficult to discover anything corresponding to them upon a modern map of Africa.

Fortunately, Ptolemy himself discloses to us the slender authority upon which his delineation of these lakes is founded (I. 9, 17). It is evident that he found depicted upon the map of Marinus a number of lakes lying near the coast, such, for instance, as are referred to by Artemidoros, who even mentions a river "Nile" as rising in northern Somal Land, which later geographers connected with the Nile of Egypt. Diogenes is reported by Marinus to have been abreast of these lakes when a little to the north of the promontory of Rhapta. No details of the voyage of Diogenes are given, except that it lasted 25 days, and the lakes referred to by him may have been farther north—for instance, near the Jub—where the Leopard River actually loses itself in a lake not far from the coast.

To a man of Ptolemy's intelligence, the idea that a river like the Nile, traversing half a continent, should rise in a coast lake on the Indian Ocean, was utterly repugnant; and it must have been with much satisfaction that he learnt from traders of Muza that these lakes were not on the coast itself, but "much farther inland." But how much farther—350 miles, or only a few days' journey? Most likely the latter. Ptolemy's map affords no indication at all that its author had itineraries connecting these lakes with the coast, nor does he hint at any itinerary in his text. He associates, however, the "cinnamon region" with his lakes; and as this region extended eastward to Aromata and Zingis, we may fairly assume that on the map of Marinus the lakes occupied a position

[1] For a discussion of this question, see Dr. Müller's editions of Ptolemy and the Minor Greek Geographers.

somewhere in the northern Somal country. It is there Ptolemy found his "Nile Lakes"; but instead of leaving them where they had been correctly placed by his predecessor, contenting himself with severing all connection between them and the Nile, he chose to do otherwise. He retained the lakes as heads of the Nile, but swept them far into the Interior. The same process was applied by Ptolemy to the lake in the Myrrh country, which figures upon his map as "Coloe." The "Mastitae," who are stated to dwell between this Coloe and the Nile lakes, cannot therefore be the "Masai," as suggested by M. Berlioux, but are more likely a tribe which dwelt to the eastward of the Hawash. Perhaps our modern Harar occupies the site of their capital, Maste.

As to the "Mountains of the Moon," it may safely be asserted that, in the locality indicated by Ptolemy—that is, in the country at the back of the Anthropophagi—there are no mountains answering their description. The only snow-clad mountains of Africa known to the ancients were those of the Atlas and of Abyssinia (Semen), and only the latter can have fed the Nile. To expect us to believe that the remote Ruwenzori was one of them is really asking too much. Mr. Cooley, who has devoted considerable attention to this subject, suggests that the whole passage referring to these mountains is an interpolation of later date, and forms no part of the genuine text of Ptolemy. This, however, is probably going too far: for, although many of the immediate followers of Ptolemy are silent with regard to these mountains, and even advance hypotheses of the origin of the Nile quite inconsistent with their existence, there remains the fact that Philostorgius (died, 430) speaks of a country in Eastern Africa named after the moon; that a "geographical fragment" of the fifth century, or of a later date, describes them; that nearly all the Arab geographers have something to say about a Jebel el Komr, or el Kamar (Green or Lunar Mountains), feeding the head-streams of the Nile; and lastly, that there actually does exist a country in Eastern Africa named "Land of the Moon," or Unyamwezi. This vast region is now split up into numerous rich communities, but may well have formed a powerful empire in a former age, whose name and reputation were carried by caravans down to the coast, just as in a subsequent age "Monemugi" became known to the Portuguese, without their learning anything about the vast lakes that lay beyond it. Indeed, Unyamwezi may have extended at one time to the very coast itself.

Ptolemy's Successors.—The centuries following Ptolemy's great achievement added next to nothing to our knowledge of the sources of the Nile. Orosius (410) and his follower, the Istrian Æthicus, know nothing of Ptolemy's lakes, but connect the great African river with the Nile of Artemidoros, in Somal Land, and make it pass through a large lake, on issuing from which it is described as forming cataracts, and then flows on to Meroe. This is clearly a resuscitation of the ideas of Marinus. The "great lake" may possibly be identical with Lake Tsana in Abyssinia.

Of quite a different character is the information of a "Geographical Fragment" of the fifth or a later century, which has been published in

Hudson's *Minor Greek Geographers*. I have embodied its information in a small map, on examining which you will at once perceive that we have before us merely an amplified reproduction of Ptolemy's lakes, the unknown author having affixed names to various objects, some of them to all appearance of his own invention. The "Crocodile Lake" reminds us of the fresh-water lake referred to by Artemidoros, which is said to contain crocodiles; the "Lake of the Cataracts" may be meant for Lake Tsana, whilst the "Great River" to which these lakes give rise is represented as flowing through the country of the Champesidae—that is, Abyssinia—for Mr. W. D. Cooley points out that Khampesia is the modern Greek mode of writing Habesh.

The Arabs.—This map, therefore, throws no fresh light upon the question of the Equatorial Lakes of Africa. Nor do we obtain more comfort by consulting the writings of the Arabs. Whatever the Arabs may have done in enlarging our knowledge of the Sahara and the Western Sudan, they have added little to what we knew previously about Abyssinia and the sources of the Nile; and if their knowledge of the eastern coast of Africa extended farther south than did Ptolemy's, their maps are very inferior to that of the Alexandrian geographer. They accepted, in fact, Ptolemy's Mountains of the Moon and the Nile Lakes, but placed a third lake at the junction of the two head-streams, from which they derived not only the true Nile but also the river of Ganah, or the Nile of the Sudan (*i.e.* Niger-Senegal), and the Nile of Magdashu, or Leopard River. This great source-lake is named "Kura," or Kawar, and is undoubtedly the Tsad. Shems-ed-Din (*c.* 1331) has these same lakes, only with more elaboration. His eastern Nile lake is clearly the Fitri, on whose shores dwell the Kuka; his western lake may be represented by the swamps of the Tuburi; his many parallel rivers seem to stand for the arms of the Shari; whilst the northern lake, said to be named Kuri by the Sudanese, is undoubtedly Lake Tsad, for a tribe named Kuri still dwells upon some of its islands. The Nile of Nubia flows out of this lake to the northward, the river of Ghana flows west, and that of Magidshu (Makhdeshu or Madisha) into the Eastern Ocean. Of course, if the great lake of the Arabs represents Lake Tsad, their Mountains of the Moon must be looked for to the south of Bornu, in Mandara. That some of the details mentioned by Arab writers in connection with these lakes may refer to Abyssinia and Lake Tsana, is not impossible.

Mediæval Maps.—Our mediæval cartographers were content for a time to copy Ptolemy and the Arabs, but when the great enterprise of the circumnavigation of Africa, set on foot by Prince Henry, began to bear fruit, and closer connections had been established with Abyssinia, authentic information of what was then considered the country giving birth to the Nile was received in Europe. The oldest map which bears evidence of these acquisitions, and one of the most remarkable cartographical documents in existence, is that prepared by Fra Mauro, a learned monk of Murano (1457). His Abyssinia, as we are told in one of the

numerous legends inscribed upon the map, is based upon information received from priests of that country. It exhibits its features far more correctly than does any other map up to the time of Tellez, who was able to avail himself of the labours of the Portuguese missionaries. The copy of this famous map, which I place before you, clearly reveals this fact, but it also shows that Fra Mauro enormously exaggerated the distances. His map has neither degree-lines nor a scale, but, taking the length of the Mediterranean for a unit of length, it will be found that the central lake of Abassia (Abyssinia) lies as far north as 2° S., whilst all Southern Africa, almost to its farthest extremities in lat. 33° S., is filled up with features belonging to Abyssinia. On this map may be traced not only the Abai, rising in Lake Tsana, and its tributary the Tagaz (Takazze-Atbara), considered by Fra Mauro to be the main Nile, but also the Hawash (Auasi), Lake Zuua (Zuway), and the Upper Xibe (Gibbe), or river of the Gallas, which is made to debouch in the Indian Ocean, as on nearly all but our most recent maps. The principal places along the eastern coast of Africa, as far as Sofala, can be identified. Fra Mauro, at all events in this part of the map, has quite abandoned Ptolemaic hypotheses, but he identifies Abassia with Ptolemy's Agysimba, and places in its centre the "Giebelchamir" (Jebel Kamar), or Mountains of the Moon, just as W. D. Cooley did four hundred years afterwards. Had Fra Mauro's materials been properly utilised, our old maps of Africa would have shown, long before Ludolphus drew attention to that fact in 1687, that next to nothing was known about the Interior.

Unfortunately, Fra Mauro's successors had so high a respect for the authority of Ptolemy that they felt restrained to retain his Nile lakes upon their maps, and to combine them with information obtained through Abyssinian sources. Martin Behaim's globe (1492) is an instance of the kind, for upon it features clearly belonging to Abyssinia, though apparently not derived from Frau Mauro's map, are made to occupy nearly the whole of South Africa. His large lake, in latitude 10° S., in the very centre of Africa, is clearly an expanded and embellished version of one of Ptolemy's Nile lakes, for the Mountains of the Moon lie to the south of it. But having crossed these mountains, we still find ourselves in "Abasia," as is proved by such names as Gafat (a well-known district in Gojam), Gama (Jemma), and others. Behaim was content to drain his lakes through the Nile. To Juan de la Cosa (1500), a Spanish pilot, who had, however, at his command the information collected by Portuguese explorers and discovers, belongs the doubtful merit of having introduced a South African central lake, giving rise at the same time to the Nile, the Zaire, and to a river flowing to the north-east, evidently a modification of the notions entertained by the Arab geographers with reference to Lake Kura. Ruysch (1507), and Schöner on his globe preserved at Frankfurt (1521), retained all Ptolemy's lakes in their integrity, but they introduced an independent river, having no outlet into the ocean, and apparently represented by Fra Mauro's Auasi (Hawash). Hylacomilus, who is best known as having bestowed the name of America upon the New World, revised an old map of Africa for a new edition of Ptolemy in 1521, and placed upon it a huge lake in

the very centre of South Africa (in 15° S.). He calls this lake "Saphat," a name anciently given by pilgrims to Lake Tsana. The nomenclature of his map proves distinctly that this lake occupies the centre of Abyssinia. Bali, the southernmost province inserted upon it, is a district to the south-east of Shoa, still known by that name.[1] On the globe, which Gerhard Mercator made in 1541, the great central lake of Hylacomilus bears the name of Sachaf—a corruption, I should say, of Saphat, or Caphat (Cafates)—and is joined by a river flowing to the Indian Ocean, to the south of Zephala (Sofala). Subsequent compilers of maps retained this lake; but they connected it, at their good pleasure, with the Nile, the Zaire, or any other river reaching the coast, until, at length, on such maps as those of Lazaro Luiz (1563) and Ortelius (1570), we find it sending forth emissaries in all directions.

A map of quite a different type is that by Giacomo Gastaldo, a Piedmontese (1548), who consulted De Barros, apparently, with little profit. He retains Ptolemy's lakes, as also the "Mountains of the Moon," but adds thereto several others, all of which, as can be gathered from the nomenclature, ought to be removed far to the north, into Abyssinia. The southernmost countries mentioned by him are Adia (Hadia) and Damot, well-known provinces of Abyssinia; and these he places in latitudes 20° and 25° S. on a river called "Rio de Linfante," which is the Great Fish River!

The last map which I shall refer to is that which accompanies Lopez's famous work on Congo, edited by Pigafetta (1591). This map has received much indiscriminate praise, but, as far as the interior of Africa is concerned, it is, in truth, a most extraordinary hotch-potch of ill-digested information derived from Ptolemy, the Arabs, and later writers and map-makers. A great Central Lake is situated between latitudes 10° and 14° S., and sends forth the Cuama (Zambezi), and the Manhice (which enters Delagoa Bay). The names "Minas do Cafates" (Gafat), Bagamidrj (Begameder), and Tacuy (a misprint in De Barros for Tacaz or Takazze), which are written near it, show that we are in Abyssinia. A huge river flows northward from this lake into an Equatorial "Lagoa do Nilo," from which issue the Zaire and the Nile. The people living near this lake are said to have stone houses like the Portuguese. Near this lake are Amara (Amhara), Ambian (Dembea), and Chedalasta (Lasta), and it is, therefore, clearly meant for Lake Tsana. From this lake the Nile flows to the island of Meroe, before reaching which it is joined by a river issuing from Lake Colue (Ptolemy's Coloe), to the west of which are placed the Fungi (that is, the Funj, who dwell to the west of the Blue Nile) and Beleganze, a compound made up of "Bali" and "Ganz," the names of two districts of Shoa. The river Golues, which issues from this lake, receives the Tacasj (Takaze) as a tributary. Again, to the north-east of this lake there is depicted a Lake Barcena, which is the veritable Tsana. Two rivers issue from it, one reaching the sea at Zeila, another joining the Nile at Meroe. The confusion in the

[1] M. Wauters (*L'Afrique Centrale en* 1522) published a facsimile of this map. The legend, which he failed to decipher, should be read: "Hic est magna copia auri." This is said of Damut, also a province of Abyssinia.

delineation of the hydrographical features of Africa could hardly be greater. How inferior are all these maps to the intelligible and, in its main features, correct representation of worthy Fra Mauro!

The early reports of the Portugese explorers, and the writings of "geographers" of the period, though abounding in allusions to Equatorial lakes, tell us really nothing about them. The knowledge of Abyssinia, and of its lakes, was very extensive at quite an early period, as evidenced by Fra Mauro's map; and it only needed a master-hand to sift and reduce these ample materials to reasonable proportions in order to produce a fairly accurate map. Of the existence of our modern Lake Nyasa, the Portuguese may be presumed to have had an inkling at an early date; and it became first definitely known to them in 1616, when Gaspar Bocarro, on going from Tete to Kilwa, passed for some distance along it. In the course of the eighteenth century the Portuguese became acquainted with Lake Bangweolo, and probably also with the Moero, although they had no idea of its great extent. The allusions of early writers to the great lakes supposed to exist in Equatorial Africa were provoked by the very misleading maps which enjoyed a very high authority at the time. The original references to such lakes are very few indeed. Encisco (1519) would have us believe that the people of Congo told him that their river, as well as the Nile, rose from a large lake in the "Mountains of the Moon." This, certainly, is making too great a demand upon our credulity. Manuel Pacheco (1536), who proposed to King John III. to explore the Congo River, is far more reasonable when he tells us that that river is reported to rise in "lakes," a very vague term in the mouths of Africans, and quite as applicable to Stanley Pool, or a broad river, as to a more extensive sheet of water. The only other reference to lakes, on the part of an actual explorer, which I have been able to discover, is made by Balthasar Rebello de Aragõa (1600), who left Loanda with the intention of crossing to the Contracosta, but did not even get as far as the Kwango. He was told that there existed a large lake, in about latitude 16° S., from which rose several rivers. All I can say is, that this worthy Portuguese was misinformed, for no large lake is to be found in the direction pointed out to him. Possibly the swamps of Lovale, or a small lake like the Dilolo, were alluded to. Of the interior of Eastern Equatorial Africa next to nothing was known. Albuquerque (1506) heard that a river flowed at the back of Magadisho; Enciso (1519) mentions the Ethiopian "Mount Olympus," which can be no other than Kilima-njaro; and quite a number of writers allude to a powerful empire, Monemugi, supposed—quite erroneously as we know now—to have extended from Monomotapa, on the Zambezi, to Gurage, one of the southern provinces of Abyssinia, and possibly identical with the modern Unyamwezi.

Our great African lakes—the Tanganyika, Victoria, Albert, and Albert Edward, I feel convinced, only became known in the course of this present century, since caravans of Arabs and Swahili penetrated the Interior in search of slaves and ivory. The credit of having discovered them is due to these enterprising traders, but for their delineation upon our maps we are indebted to such men as Burton, Speke, and Grant, Livingstone, Baker, and Stanley.

DEFINITIONS OF GEOGRAPHICAL NAMES.

By Konrad Ganzenmüller, Ph.D.

The teacher of Geography finds it impossible to avoid using a great number of foreign names; and these the student must, of course, be expected to remember. However discouraging at first, the study will eventually become extremely attractive if the scholar be made to see that the names are not mere sounds, but, on the contrary, significant forms capable of interpretation.

It is true that this is not the case with all names. There are some which cannot be explained; and the method of instruction will occasionally not admit of an etymological explanation of words of remote and obscure origin. Passing over these, there remain a considerable number of geographical names that may be made clear and intelligible through the languages to which they belong, if only the proper method be employed. Merely to give the name and the meaning of it—whether this be done by the teacher himself or set down in a book—would be to impose an additional burden on the scholar's memory. If rightly used, on the other hand, the explanations should assist the memory, lighten the task of the teacher, and give a living interest to the lesson.

Even the most repellent names of the Chinese cities, rivers, etc., may be made intelligible in this manner. With the map of this, the most densely-populated empire on the globe before him, the teacher may remind his pupils that, in English, monosyllabic words are frequently put together without any change, *e.g.* north-east, south-east, Great Salt Lake, New Zealand, etc. He may then add that the Chinese have in their singular language none but monosyllabic words, which can only be joined directly to others. By way of illustration, he may write on the black-board, in a column, the words: *pe*=north, *tong*=east, *nan*=south, *si*=west; and in a second column: *king*=capital, or king's household; *hai*=sea. If, in a third column, be written the names *Pe-king* and *Nan-king*, the scholars will see at a glance that by the former the Chinese understand "the northern capital," and by the latter "the southern capital." These two capital cities of China, it might be shown, have their parallel in the Russian cities of St. Petersburg, the residence of the Tsar, and Moscow, the place of his coronation. (During the last two centuries, it is true, the Emperors of China have always resided in Peking). By this simple process even a pupil of dull wit will soon cease to be bewildered by these strange names: he will remember them with comparative ease, and will recognise their true geographical position.

If, now, the teacher point on the map to the sea that bounds China on the east, he will find that the scholar will understand at once why it is called *Tong-hai*; and that *Nan-hai* must be the name of that sea which washes the southern shores of China. In this latter sea, in the "south of the sea," is the island *Hai-nan*.

These examples having been sufficiently explained, and the words set down on the black-board having been copied out by the scholar, the teacher may then write under *si* the words: *chu*=pearl, *kin*=gold, *sha*=

sand; *pei*=white, *hŏáng*=yellow, *ta*=great; and below *hai*: *kiáng*=stream, *ho*=river.

Attention may then be directed to the confluence of the three rivers near the city of Canton, flowing from points of the compass after which they are named. The *Si-kiang*, or "the western stream," has a place in the majority of school-books; and the pupil, looking for a *Pe-kiang*, or "northern stream," and a *Tong-kiang*, or "eastern stream," is able at once to form in his mind, and to retain a far more lively idea of, a river-system and the importance of its commerce than that which any other method of teaching could convey.

The three rivers just named unite and form the *Chu-kiang*, or "the pearl-stream." The *Yang-tse-kiang*, or "the stream of" (the ancient province of) "Yang," which is very broad and deep in its lower course, and navigable for large vessels a great distance from its mouth, is also named *Ta-kiang*, or "the great stream"; and, farther up, *Kin-sha-kiang*, or "the stream with golden sand." The *Hoang-ho*, or "yellow river," cuts a deep bed through the yellow soil, from which it derives its colour. Yellow Sea=*Hoang-hai*; *Pei-ho* (on which Pe-king is situated)=the white river.

With younger pupils the explanation of names might stop at this point for the day, and the rest of the lesson might be devoted to a general account of China and its remarkable people. In the case of elder scholars, the teacher might proceed to speak of the coast, the mountains, the rivers, etc. For these pupils he would write below *ta*: *tĭán* or *tĭén*=heaven, *shang*=upper (upward), *chung*=the middle, *ngan*=rest; and below *ho: shan*=mountains, *mo*=desert, *tsin*=ford, *chin*=market-place; and in a third column: *Tian-shan*=mountains of heaven, *Tien-tsin*=ford of heaven.

Here the teacher would point out that the word *hĭá* signifies "below," and that the Chinese call their empire by the name *Tien-hia*, "below heaven," meaning by this the earth; and he would thus correct the mistaken expression of the "Celestial Empire."

Then would follow: *Sha-mo*=sand desert (the Chinese name for the Gobi Desert); *Shang-hai*=upper sea (situated inland from the sea), *Chung-king*=the middle capital; *Tong-king*=(country of) the eastern capital; *Si-ngan*=(place of) rest, or peace in the west; *mai*=to buy, *mai-mai*=to buy and to sell, to trade; and *Mai-mai-chin*, usually *Mai-ma-chin*=a place of trade. *Fu* designates, further, a city of the first rank, or a city with a prefecture; and *cheu* (meaning a district) one of the second rank.

Thus, it is easy to see that the pupil's mind must be roused, and in the highest degree interested in a subject presented in a manner at once so concise and so direct. What before were meaningless sounds have now become instinct with life through the explanations given; and it cannot be doubted that, whatever be read or studied concerning China will be firmly retained by the mind.

Applying the same principle to the names of Mongolia, opportunity will be found for instituting striking comparisons. *Dagh* (Turkish)=mountains, *muren* (Mongol)=river, *tengri*=heaven, *kara*=black. The

Mongol-Turkish *Tengri-dagh*, it will be seen, has the same meaning as the Chinese *Tian-shan*, "mountains of heaven." *Kara-Muren* (now Amur) is "the black river." If the pupil be now reminded that, in the Balkan Peninsula, there are to be found the *Kara-dagh*, or "the black mountains," and the *Kara-su*, or "the black river," he cannot fail to note and to remember the wide range of the Mongolian race. And when he hears, in the lesson on Japan, that *to* means "east," and *sai* "west," and *kio* "capital"; so that *To-kio*=eastern capital, and *Sai-kio* (*Kiyoto* or *Meako*)= western capital, he must be struck with the likeness of these expressions to the Chinese *tong*, and *si*, and *king*.

Referring to the East Indies, it would be advisable to consider the Archipelago, Hindustan, and Further India together, and to divide the names in accordance with their respective languages. Many of the names belong to Sanskrit, or to its derivative, Hindustani.

It will be best to study at first the appellations of the islands and mountains and rivers, and afterwards to take up the cities. *Diva*, or *dvipa*, it is found, means "island"; *Malaia*, the coast of Malabar; *singh*, "a lion"; *java* means "barley," "grain," and *lak*, or *laksha*, "one hundred thousand." Of the old name *Java-diva*, "grain island," the first part only has survived. It is the same as *Singhala dvipa*, "island of the lions," from which *dvipa* has been dropped, while the *Singhala* has become *Ceylon*, though the inhabitants are still known as *Singalese* (Cingalese). The *Laccadive Islands* are so called because of their immense number, or *Laksha dvipas*=hundred thousand islands; and the *Maldives* take their name from the compound word *Mala-dvipa*, "garland of isles."

Giri=mountain, mountains, *sindhu*=stream, *ganga*=river, stream, *nadi*=river; *Brahma* (*n*)=name of God; *Sankar* is a surname of the god Siva, *devi*=goddess; the goddess Parvati is also called *Nanda*=happiness, *Kali*=the goddess of destiny, *raja*=king, and *rashtra*=kingdom; *putra*=son, *ālaya*=abode, *hīma*=snow, *dhavala*=white, *gauri*=white, or fair, *nila*=blue, *maha* (*t*)=great.

Putting these together, it is easily seen that "the abode of snow" must be *Himálaya*, and the Blue Mountains *Nilagiri* (*Nilgiri*), "the white or fair (god) Siva" will be *Gaurisankar*, "the goddess Nanda" *Nandadevi*, the White Mountain *Dhavalagiri*, and "the son of Brahma" *Brahmaputra*. (*Ganga*), *Ganges*=stream, and *Kaliganga*=river of Kali. We at once recognise in *Mahanadi* "the great river," in the analogous combination, *Maharaja* "the great king," and in *Maharashtra* "the great kingdom." The *Marathas* are, therefore, "the inhabitants of the great kingdom." The name of India itself is taken from the word *Sindhu*, after the Persian pronunciation *Hind*, hence the Greek Ἰνδος, the Latin *Indus*=a stream.

Pura means a city, *nagar*=city, *patna*=city, town, *kata*=ground, holy place; *Sri*=the goddess of good fortune, *naga*=serpent. In the history of Alexander the Great mention is made of *Pura*, a city of Gedrosia, and *Singapore* is, of course, *Singhapura*=the lion's city, the island taking the same name; *Nagapura*, *Nagpur*=the city of serpents. *Patna*, "city," is a well-known emporium on the Ganges. *Srinagar* (in Kashmir)=the city of Sri (the goddess). *Calcutta* (*Kalikata*)=the holy place of Kali, the goddess of destiny.

Deccan (formerly *Dakshina-patha*, or the south way) means the "south," or "southern land"; and the mountains of *Ghats* (*ghāt* is "an ascent in the form of steps") were so named because they are very rugged and steep, and the entrance into the Interior is over only very narrow and difficult passes.

In North-Western India the names are frequently of Arabian and Persian origin. *Stan* = land, *āb* = water (and hence, "the land between rivers"); *abād* = city, *pur* = city, town, *Allah* = God, *shah* = king, *shikar* = hunter, *Hindu* = Indian, *Haidar* (a personal name) = lion; other proper names are *Ahmad*, meaning "the praised," and *Murshid*, "guide," or "spiritual teacher"; *Aurangzib*, the "ornament of the throne," was a famous Mogul, reigning from 1656 to 1707; *panj* = five.

From these we have: *Hindustan*, the land of the Indians, *Panjab* = land of five rivers; *Allahabad* = the city of God; *Haidarabad* (on the Indus and in Deccan) = city of Haidar; *Ahmadabad* = city of (the Sultan) Ahmad; *Aurangabad* = city of (the Great Mogul) Aurang-(zib); *Shahabad* = king's city; *Shikarpur* = hunter's town.

It will illustrate the vast extent of the Arabian empire in former times to remind the pupil that the name of the southern district of Portugal, Algarve, is also Arabic, and signifies "the West."

In the Malayan language *Timor* (the island) means "east," and *Timor-laut* = north-east. The Cingalese *palk* means "whirlpool," hence the Palk Straits. *Colombo* = harbour, and *Galle* = rock. *Cheri* (Tamil) = village, hamlet, *pudu* = new, and *Pondicherry* = (for Puducheri) new city.

India (including—as already mentioned—the islands) has also names of European origin, such as the English words: *strait, mount, settlement. Mount Everest* (Gaurisankar) received its present name from Sir Andrew Waugh, who ascertained its height, 29,002 feet, in honour of Sir G. Everest, the Surveyor-General of India. The *Strait Settlements* are the settlements along the Strait of Malacca.

Dutch names also are met with: *zorg* = care, *buiten* = without, *Buitenzorg* = without care (*cf.* the French Sans-souci), a town of Java, thirty-six miles south of Batavia, the capital, which has a fine harbour, but an unhealthy climate. This capital of *Batavia* itself takes its name after the *Batavians*, an ancient tribe (in the modern Zeeland, in the kingdom of the Netherlands).

The *Philippine Islands* are called after *Philip* II., king of Spain (from 1556 to 1598). By the Portuguese the name *Elephanta* was given to the island near Bombay, because one of the most conspicuous works of art was a colossal *elephant* wrought in stone (but now all in ruins).

The lessons on Irania, Arabia, Asiatic Turkey, and Asiatic Russia should be proceeded with in a similar way.

In Africa there might be made three divisions of names: those of North and North-East Africa, those of Central and South Africa, and those of the East and West Coasts and the islands.

In Central and South Africa the Negro languages are very much alike, and new words are formed by prefixes, as in the following: *Sungu* = white; a white man is called *M'sungu*, and a number of white men is *Wa-sungu*; the white man's country is *U-sungu*, and his language

Ki-sungu. *U* = country, and with this prefix are formed the many names of countries in *U*, such as *U-nya-mwesi*, the moon-land, from *mwesi*, the moon; *Uganda*, a fertile region towards the north-west of the Victoria Nyanza (*Nyanza* meaning lake), and many others.

On the Zambezi (which means "stream") are the Victoria Falls, known to the natives as *Mosiwatunya*, a word that expresses the astonishment and awe with which they behold this mighty cataract: *Mo si wa tunya*, "Here roars the smoke!"

The coasts of Africa, we learn from history, were first visited by the Portuguese, and the record of their presence endures in the appellations borne by the natural features of the country. For instance, *angra* = bay, *cabo* = cape; *pequeno* (fem. *pequena*) = little, *verde* = green, *negro* = black, *delgado* = slender. The pupils will, therefore, see for themselves that *Angra Pequena* means "little bay," and the teacher may remark how the name of the bay has been extended to the bordering coast. *Cabo Verde* = green cape, *Cabo Negro* = black cape, *Cabo Delgado* = slender cape, etc. Explained in a similar way, the names taken from other languages will be found to be no less significant.

In South and Central America, in Mexico, and in the West Indies very many names come from the Spanish (in Brazil they are of Portuguese origin), and these are often easily understood.

Even the formidable Mexican words will be divested of their terrors by a little intelligent study. *Tépetl* = mount, *cíhuatl* = wife, *cítlalin* = star; *iztac* = white, *pópoca* = smoking. *Citlatépetl* is, therefore, "star-mountain" (so named, because the top of this volcano, during an eruption, glitters like a star); *Pópocatépetl* = smoking mountain (volcano), and *Iztaccíhuatl* = white wife. This last is an appellation quite similar to that of the Swiss mountain, the *Jungfrau*, so called from its white, shining appearance, as of a white-robed nun, by the side of its dark neighbour the *Mönch* (monk). Explained in this way the name *Iztaccihuatl* loses its uncouthness.

Méxitli (*Méjitli*) was the name of the Mexican god of war, and *Mexico* signifies the "city of the god of war" (the name of the city has been extended to the country). *Atl* or *a* = water, *nahuác* = near, and *Anahuac* means, therefore, the land "near the water" (*i.e.* near the lakes on the highland of Mexico), *mázatl* = deer, hence *Mazatlan* = a place of deer, *zácatl* = straw (of Indian corn), *Zacatlan* (now in a Spanish form *Zacatecas*) = place of corn-straw, *tláxcal* = bread, *Tlaxcallan* (now *Tlascala*) = place of bread. *Quáhuitl* = tree, wood, *téma* = put down; of these two words are formed *quatemalli* = pile of wood, and *Guatemallan* (now *Guatemala*) = place of pile of wood.

A great number of the geographical names of the United States and of British North America, and also of Australia and Polynesia, are for English scholars self-evident. In these countries many geographical points and places have been named after distinguished seamen, or other men of high renown, in honour of certain days or events, and such-like. Concerning these, the teacher will state the most prominent facts, remembering, however, that the main object is always the explanation of those names, which can be easily interpreted from the respective languages, while

their forms are such as to admit of their being traced by the unassisted efforts of the students themselves.

If we now come to treat of Europe, it will be found that the Balkan Peninsula played a most prominent part in ancient history; and here the geographical names must be arranged according to the different languages from which they are derived. There is great diversity in these languages; and from these introductory remarks it will be possible to form a clear conception of the vicissitudes suffered by the people of this region. In a similar way the names in Italy, in the Iberian Peninsula, in France, in Sweden, Norway and Denmark, in Belgium and Holland, and in Russia ought to be taken up and explained.

In treating the Polish and Tzechish geographical names, the teacher should point out the great extent of country formerly held by the Slavs between the Elbe and the Saale rivers, the Fichtelgebirge, and the Böhmerwald. As a consequence of this, many of the names in the eastern part of the neighbouring country are of a Slavonian origin, and call for explanation.

In treating of the German Empire, German Austria and Switzerland, it will be found that for English scholars it is very easy to interpret and explain many of the German geographical appellations. *Gebirge* signifies "mountains," *Berg* = mountain, *Koppe* = (head), peak, *Höhe* = height, or hill, (der) *See* = lake, *Gau* = district, *Wald* = forest, woody mountains, *Feld* = field, *Fichte* = pine, *Erz* = ore, *Sandstein* = sandstone, *Schnee* = snow, *König* = king, *Riese* = giant; *Licht* = light, *schwarz* = black; *unter* = among.

From these are formed *Riesengebirge*, meaning "giant mountains"; *Fichtelgebirge*, "pine mountains"; the *Schwarzwald*, or the "Black Forest," so called on account of having been covered with dark pines; *Böhmerwald* = Bohemian Forest; the *Erzgebirge*, or the "ore mountains" yielding silver, lead, and tin. *Elbsandsteingebirge* = sandstone mountains along the Elbe; *Schneekoppe* = snowy peak; *Schneeberg* (in the Sudetes, in the Fichtelgebirge, and in the Elbsandsteingebirge) = snowy mountain; *Feldberg* (in the Black Forest and in the Taunus) = mountain in the field; *Königsee* (in Bavaria) = king's lake; *Aargau* (in Switzerland) = district on the Aar; *Unterwalden* = among the woods; *Liechtenstein* (the principality) = the light stone.

The teacher will further explain: *Bach* = brook, *Münde*, and *Mündung* = mouth, *Hafen* (*Haven*) = harbour, port, *Bad* = bath, *Burg* = castle, *Stadt* = city, *Dorf* = village, . . . *hausen* = town, village, *Kirche* = church, *Mühle* = mill, *Hütte* = smelting-house, *Brücke* = bridge, *Strasse* = street, high-road; *Mönch* = monk, *Jäger* = hunter, *Friedrich* = Frederick, *Karl* = Charles, *Wilhelm* = William, *Anna* = Anne, *Charlotte* = Charlotte, *Marie* = Mary, *Ross* = horse, *Hirsch* = hart, *Habicht* = hawk, *Salz* = salt, *Glück* = good fortune, *Ruhe* = rest, *Nord* = north; *alt* (and *old*, in Low German) = old, *neu* = new, *gross* = great, *weiss* = white, *hoch* = high; *zwei* = two, *fünf* = five.

Now, the scholar will see at a glance that the German *Neuburg* (and also *Neuenburg*) is equivalent to the English "Newcastle," that *Altenburg* and *Oldenburg* mean "old castle," and that *Weissenburg* signifies the "white castle." *Karlsburg* (in Transylvania) is "castle of Charles" (it takes its name from Charles VI., the German Emperor, who reigned from 1711 to

1740); *Charlottenburg*, "castle of Charlotte," was named after the Electress Sophia Charlotte of Brandenburg, in 1695; *Marienburg*, "castle of Mary," was founded by the knights of the "German Order," and named in honour of the Virgin Mary. *Habsburg* (formerly Habichtsburg) = castle of hawks, *Salzburg* = salt castle, *Strassburg* = castle on the high road, *Neustadt* "the new city" (in many parts of Germany), *Glückstadt* = city of good fortune, *Grossjägerndorf* (in Eastern Prussia) = great village of hunters (battle in 1757), *Mülhausen* = mill-village, *Nordhausen* = northern village, *Fünfkirchen* (in Hungary) = five churches, *Hochkirch* = the church situated aloft (eastward from Bautzen, Saxony; at this place Frederick the Great was attacked suddenly by the Austrian Field-Marshal Daun, October 14, 1758). *Bruck* (in Steyermark) = bridge, *Innsbruck* = bridge over the Inn, *Saarbrücken* = bridge over the Saar, *Zweibrücken* (commonly *Deux Ponts*, French) = two bridges.

Königsberg = royal mountain (so called after its founder, the King Ottokar of Bohemia, in 1255), *Annaberg* = mountain of Anne (so named in honour of the mother of the Virgin Mary), *Hirschberg* = mountain of harts, *Mühlberg* = mill-mountain (battle in 1547), *Königstein* = royal stone, *Wilhelmshöhe* = William's height, or hill, *Reichenbach* = rich brook, *Rossbach* = horse brook (battle in 1757), *Münden*, and also *Gmunden* (in Austria) = mouth, *Weichselmünde* = mouth of Vistula (in German, Weichsel).

Wilhelmshaven, "William's harbour," was so named from William I., the German Emperor and King of Prussia, June 17, 1869. *Friedrichshafen* (on the Lake of Constance), "Frederick's harbour" takes its name in honour of King Frederick I. of Würtemberg. *Baden* (in Baden, in Austria, and in Switzerland) = Bath; *Karlsbad* = bath of Charles (the German Emperor Charles IV. discovered, as it is said, that spring, when hunting in 1347). *Karlsruhe* = rest of Charles (its founder was the Markgrave Charles, in 1715). *München* takes its name from monks, in German, "Mönche"; some monks erected warehouses for salt upon the spot where it now stands.

Hall, it should be added, means winning salt, hence *Halle* on the Saale, *Hallstadt* (in Austria), *Reichenhall*, the rich "Hall" (in Bavaria), and *Hallein*, or little "Hall" (near Salzburg).

There are also some geographical names in Germany which can only be explained from the Ancient and Middle High-German; thus, after *slê*, meaning "a channel," is called the *Schlei*, being a long inlet of a bay of the Baltic Sea; *wîk* = village, and *Schleswig* is, therefore, "the village on the (Slê, or the) Schlei," the country taking the same name. From the word *hârt* come the *Hart* and the *Harz*, the "woody mountains"; *Spessart* is a corruption of *Spechteshart*, "woody mountains of woodpeckers" (in German "Spechte"). *Aha*, or *âch* = river, the *Salzach* is, therefore, "salt river"; *âr*, hence the *Aar* (in Switzerland) = water-course; *ôver* (now Ufer) = bank, and *han* = high; *Hanover* = the high bank. *Mickel* = great, and *luzil* (*lützel*) = small; (*Mekelenburg*), now *Mecklenburg* = the great castle, and *Lützelburg*, or *Luxemburg* = the small castle.

Some geographical names in Germany originate from the Latin language. The Romans founded a city on the confluence of the Rhine and Moselle, and called it from its situation *Confluentia* (hence the present name *Coblenz*); and farther downwards on the Rhine *Colonia*

Agrippina, the present *Cologne* (in German, *Köln*), *colonia* meaning "a settlement." *Curia*, hence *Chur* (in Switzerland), signifies "residence"; and *castellum*, hence *castel* (opposite the city of Mainz), and *Cassel* (in Hesse) is the English "castle"; *specula* = watch-tower, hence the Splügen Pass. The word *taberna* means a "house of meeting" for travellers, from whence comes the name of the *Zabern-passage* (near Strassburg). In the Middle Ages Latin was the language of the clergy and of learned men, and from those times we have *Celle* (Latin, *cella*), in Hanover, meaning "a cell" (of a monk); *Appenzell* (in Switzerland), "cell of an abbot" (Latin, *abbas*), and *Münster* (in Westphalia), "monastery" (Latin, *monasterium*); *vicus* = village, and *Brunonis vicus*, now *Brunswick*, means, therefore, "village of Bruno" (this city was founded by the Saxon Duke of Bruno, A.D. 861).

Southern Germany was in ancient times inhabited by the Kelts. In their language *carn* meant "a rock," and hence the *Carnic Alps* take their name from the limestone of which they are roughly built up. *Dun*, or *danu* = high, *Tannus* = the high, or the height. *Rênus*, now *Rhine* = the streaming water, or the river; *lûc* = stone, hence *Licus*, now *Lech* = stony river; *dâna* = impetuous (violent). To the ancient Keltic name *Dana* the German term *ahwa*, or *ouwa*, was added, and it was formed *Dan-ouwa*, now in German, *Donau* (Latin, *Danuvius*), English, *Danube*, the "impetuous river." *Briga* = mount, and *Brigantium*, now *Bregenz*, means, therefore, "place," or "city on the mountain."

From the Lithuanian *báltas*, "white," we have the *Baltic Sea*, or the "white sea."

It might also be mentioned that the island of *Rügen* takes its name from the ancient German tribes of *Rugies*. *St. Gallen* was called in honour of *Gallus* († A.D. 614), who there built a monastery; and *Constance*, after its founder *Constantius*, father of Constantine the Great. By the Romans was founded, in 15 B.C., on the Lech, *Augusta Vindelicorum*, or "the city of Augustus, in the country of the Vindelices," latterly *Augustburc*, then *Ougsburg*, now *Augsburg*, or castle of Augustus (the Roman Emperor).

In treating the geography of his own country the teacher will, first of all, explain to his pupils, and at once illustrate by examples nearest home, that there are some geographical names intelligible at first sight, others that admit of an interpretation more or less easy, and others again, the origin and meaning of which are lost in obscurity. Then he will give instances, taken from Great Britain and Ireland, from Australia, the United States, etc., and it will be found that names such as the following are self-evident:—*Shark Bay*, *Fair Island*, *The Land's End*, *Black Hills*, *Rocky Mountains*, *Red River*, *Grand Canal*, *Capetown*, *Hot Springs*, *Newport*, *Whitehaven*, and many others; further, that some names are easily understood, if we imagine the signification of the respective syllables and words in former times, or in previously-spoken languages, *e.g. wich* = village, and *Greenwich* is, therefore, "the green village"; *Norwich*, "the northern village"; *Sandwich*, "sandy village"; *folk* (an Anglo-Saxon word) = people, and *Norfolk* means "northern people," and *Suffolk*, "southern people." In the Keltic language *dun* signifies a "hill," and *Snowdon* means, therefore, "snowy hill," etc., etc. All this will be made clearer by citing examples taken from other countries and languages.

It is very interesting to see that nations separated by the greatest distances have sometimes similar geographical appellations. As already mentioned, the German *Jungfrau* is practically equivalent to the Mexican *Iztaccihuatl*; the Chinese *Peiho*, like the Turkish *Aksu*, the Arabian *Bahr-el-Abiad*, the New-Greek *Aspropotamo*, the Russian *Bielaia*, the Portuguese *Rio Branco*, signifying the "white river." The Hebrew *Bethlehem* means "house of bread," and the Mexican *Tlaxcallan* (*Tlascala*) is "place of bread," etc.

Names of cities and towns of later origin are often derived from a characteristic circumstance, or some more or less remarkable natural feature, such as bath, well, spring, water, creek, ford, river-mouth, harbour, head, hill, mountain, stone, and rock.

From the words *bath*, *well*, *spring* are derived: *Bath*, *Baden*; *Holy Well*, *Hotsprings* (Arkansas), *Teplitz* and *Tiflis*, place of warm springs; *Thermopylæ*, gate or pass of warm springs; *Bloemfontein*, flower-spring (Orange Free State).

From *water* and *creek*: *Stillwater* (Minnesota), *Rossbach*, horse creek, *Reichenbach*, rich creek.

From the word *ford*: *Oxford*, *Hartford*, *Waterford*, *Rockford* (Illinois), *Fürth*, ford (Bavaria), *Brody*, ford (Galicia), *Bohemian Brod*, and *German Brod* (Bohemia), *Tientsin*, ford of heaven (China).

From *river-mouth* and *harbour*: *Alnmouth*, *Falmouth*, *Grangemouth*, *Plymouth*, *Portsmouth*, *Yarmouth*, *Münden* and *Gmunden* mouth; *Ostia*, city of the mouth (of the Tiber), *Weichselmünde*, mouth of the Vistula. *Newhaven*, *Whitehaven*, *Newport*, *Southport*, *Maryport*, *Porto*, port; *Puerto-Rico*, rich port, *Porto Alegre*, the frequented port (Brazil), *Port Natal*, Christmas port (South Africa), *Puerto Principe*, prince's port (Cuba), *Port-au-Prince*, prince's port (Hayti), *Le Havre*, the harbour, *Wilhelmshaven*, William's harbour, *Kjöbenhavn* (*Copenhagen*), trade-harbour, *Bender Abbasi* (also named Gombroon), port of Abbas (Persia).

From *head*, *hill*, *mountain*, *stone*, *rock*: *Gateshead*, *Spithead*, *Maidenhead*, *Holyhead*; *Lead Hills*, *Goldhill* (Nevada), *Montreal*, royal mountain (Canada), and *Königsberg*, royal mountain (Eastern Prussia), *Freiberg*, free mountain (Saxony), *Reichenberg*, rich mountain (Bohemia), *Maidstone*, *Königstein*, king's stone (Saxony), *Tyre*, rock (Syria).

There are also classes of names which refer to the presence and the action of man upon the Earth. Such are the names embodying the words bridge, church (and minster), castle, village, burgh, town, city, and the like.

We have, for instance, from the word *bridge*: *Cambridge*, *Bruck*, bridge, *Innsbrück*, *Zweibrücken*, two bridges, *Alcantara*, the bridge (Spain).

From *church*, and *minster*: *Christchurch*, *Hochkirch*, the church situated aloft; *Fünfkirchen*, five churches (Hungary); *Westminster*, *New Westminster*, *Münster*, monastery (Westphalia); *Dunkirk* (*Dunkérque*, French), originally *Dünkirchen* (German), the church (situated) on the down.

From *castle*: *Newcastle*, *Neufchatel*, *Neuburg* and *Nyborg*; *Altenburg* and *Oldenburg*, and *Stargard*, old castle, *Middelburg*, middle castle (on the island of Walcheren, Holland); *Weissenburg* and *Belgrad*, white castle; *Freiburg*, free castle, *Strassburg*, castle on the high-road; *Temesvar*, castle

(of the Comitat, or district) of Temes (Hungary); *Tashkent*, stony castle (Russian Turkistan).

From *village*, and its equivalents, such as *wich*, *wick*, . . . *hausen*: *Greenwich*, *Norwich*, *Middlewich*, *Sandwich*, *Warwick*, *Grossjägerndorf*, as already mentioned, great village of hunters; *Nordhausen*, northern village, *Mühlhausen*, mill-village.

From *bourg* and *burg*, meaning city, from *town*, *city*: *Queenborough*, *Edinburgh*, Edwin's-burgh; *Canterbury*, city of the Cants; *Newtown*, *Freetown*, *Capetown*, and many others; *Pura* (in Gedrosia), and *Cirta* (now Constantine, in Algeria), and *Patna*, city, *Great Salt Lake City*, *Virginia City*, etc., *Neustadt*, new city (in many parts of Germany), and with the same meaning, *Nystad* (Finland), *Novgorod* (Russia), *Naples*, from *Neapolis* (Italy), *Carthage* (North Africa); *Irkutsk*, city on the Irkut river, *Tobolsk*, *Yeniseisk*, etc.

Many places take their names from *God*, from *men* and *women*. Such are *Allahabad*, city of God, *Babylon* (originally *Bab-ilu*), gate of God, *Lasa*, place of God (Tibet); *Queenstown*, *Georgetown*, *Constantinople*, *Alexandria*, *Washington*, *Charlottetown*, *Annapolis*, *Adelaide*, and many others.

Examples of names derived from *animals* are: *Swansea*, *Buffalo*, *Schwerin*, place of beasts, *Singapore*, city of lions, *Stuttgart*, garden of mares, *Mazatlan*, place of deer, *Hirschberg*, mountain of harts, *Habsburg*, castle of hawks, *Nagpur*, city of serpents, *Aalborg*, castle of eels, etc.

From *plants* there are many like the following: *Oakland*; *Olynthus*, place of figs; *Figueras*, fig-trees (Spain); *Florentia*, now Florence, city of flowers; *Cracow*, city of bushes.

We find also names taken from *minerals*: *Coalbrookdale*, *Salzburg*, salt castle, *Esmeralda*, emerald (Venezuela), *Diamantino* and *Diamantina*, rich in diamonds (Brazil), etc.

In treating the subjects of Physical and Mathematical Geography, the names and words, even though familiar, should not be passed over without an explanation made on the spot. It should be shown, for instance, that the Russian *step* (*steppe*) means "a wilderness," or grassy plain, like those of Central Asia and South-Eastern Russia in Europe. So *pustina*, a Slavonic word, means "desert," and from this word the *pusztas* in Hungary are named. *Llano* (Spanish) signifies "flat," and hence the *Llanos*, the treeless "plains" on the Orinoco. From the Spanish *sábana*, "a sheet," and figuratively "a wide plain," comes the term *savanna*, "a grassy plain." The French *prairie*, adopted in English for the *prairies* of North America, means "a meadow." *Pampa*, a Quichua word, signifies "a plain," and is so applied in the Argentine Republic.

The Greek σφαῖρα (Latin *sphæra*) means "a ball," "sphere," and ἡμι "half." From these we have the word *hemisphere* for half the globe; and we speak of the eastern and the western, the northern and the southern Hemispheres.

The Latin *stella* (pl. *stellæ*) means "star," and *fixus* (fem. *fixa*) = fixed; (*stellæ fixæ*), *fixed stars* are such stars as always retain nearly the apparent position and distance with respect to each other; πλανᾶσθαι = to wander; hence *planets* = wandering stars, or such celestial bodies as revolve round the sun; κόμη = hair, κομήτης = long-haired; *comets* = hair-stars,

distinguished from the planets (by their being visible only for a short period, and also) by a stream of light proceeding from them on one side, forming a tail; ἀστήρ = star, ἀστηροειδής = star-like, *asteroids* = star-like bodies; an asteroid is one of the numerous small planets whose orbits are situated between those of Mars and Jupiter, called also planetoids. In like manner the English word *spheroid*, meaning "a globe flattened at the poles," as the Earth is, is formed from the Greek σφαιροειδής = globe-like, having the form of a globe.

The Latin verb *rotare*, "to turn like a wheel," gives us the word *rotation*, the movement of the Earth on its axis; and the verb *revolvere*, to turn again, "to revolve," with the noun *revolutio*, gives us the meaning of the revolution of the Earth, *i.e.* its motion around the sun.

The foregoing examples sufficiently show how, by applying to the rich field of geographical nomenclature a method of intelligent explanation, the teacher may give to the study a truly living interest.

The interpretation of names will offer frequent occasion for suggestive comparisons. The words *ocean* and *sea*, for instance, have for their equivalents in other tongues *Weltmeer, die See, Meer*, πόντος, *zee, more, hai*; an *island* is *Insel, isola, isla, ilha, île, ö, holm, jesira, dvipa;* a *mountain* is ὄρος, *mons, monte, mont, pen, gora, Berg, jebel, thabor, giri, tepetl;* a *city* is *cité, città, ciudad, ville, stadt, stad, dunum, gorod, pura, patna, nagara, abad, kert*, etc.

In elaborating the plan of a method for facilitating and vivifying the study of Geography by an explanation of place-names—such as in the manner already shown—it would be of service to provide a survey and review of the teacher's work. In this way the facts, made fresher by repetition, would be more deeply impressed on the memory. It is a question for consideration whether it would be more advisable to explain all the names belonging to any given language, wherever they may be found, or to treat exhaustively those of one country at a time. There is, however, some danger of going too far, and so of losing sight of the main object.

In the little work, elaborated by the writer, and entitled *Definitions of Geographical Names, with Instructions for their Correct Pronunciation* (*for the Higher Schools*), a commencement has been made with the Balkan Peninsula and its chief Greek names; and, that this expedient, as a companion to every School Geography, may be employed in geographical instruction, every European country is treated as a whole. Only in the case of Slavonic and German names has the method been somewhat varied. In the case of foreign political divisions, the larger portions have been considered together. Definitions in physical and mathematical geography form the conclusion.

As the principle of facilitating the study of Geography must always be kept in view, at first only such foreign names should be given as can be easily understood. In the "guide" for pupils separate words with their equivalents should be printed in the order already given; and, after this, in larger type, the compound names with their equivalents. A note, if necessary, should be in parentheses; and the derivation of a name from a distinguished person or from a particular incident should

be given in smaller type. Names explained in different ways, or the meaning of which is in dispute, should be excluded.

This detailed outline of a plan for explaining geographical names opens up a subject of the highest interest in itself, and has been elaborated by the writer under the conviction of its value and usefulness. It will, as he believes, draw teachers and scholars more closely together in their common object by relieving the mind of a burden of dead sounds, and replacing these with living and significant terms. It cannot but contribute to exalt the dignity and widen the scope of geographical study, and must, ultimately, add largely to the progress made in this branch of education.

In conclusion, I may mention that the above treatise, though in part originally contributed to the *Bulletin* of the American Geographical Society, has been entirely remodelled, and adapted for English readers.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

A MEETING of the Glasgow Branch of the Society was held in the Hall of the Philosophical Society of Glasgow on the evening of Thursday, 23d April, Dr. Thomas Muir presiding. Mr. W. B. Blaikie read a paper on "How Maps are Made," which was illustrated by a number of models of his own construction and by specimens of instruments used in survey-work, etc.

Mr. Blaikie repeated his lecture in Edinburgh, at a meeting of the Society held on Thursday, 30th April. Colonel Dods presided. At the close of his lecture, Mr. Blaikie was awarded a hearty vote of thanks on the motion of Dr. Hugh R. Mill.

GEOGRAPHICAL NOTES.

EUROPE.

Finland.—The growth of the population in Finland is referred to in *Fennia* (III., 2). Since 1749 fairly accurate statistics have been available. The relative yearly increase was greatest in the five years ending 1800, namely 1·87 per cent.; and it was least in the five years ending 1810 (1·01 per cent.) and 1870 (0·82 per cent.). In single years the increase was greatest in 1797 (2·44 per cent.); but since 1800 the yearly increase has never exceeded 2 per cent.

The Tcheremis.—Herr P. von Stenin has given a description in *Globus*, Bd. lviii. No. 12, of this Finnish race. The details are taken from a monograph written by Professor Smirnoff, of Kazan University, who visited this people in the spring of 1888. The main body now dwells between the Volga and Viatka; they are also found on the Kama, the Bielaja and its tributaries. Their country falls into two distinct divisions—the "Mountain Land," stretching from Vassilssursk on the west to Ilyinka on the east, and the "Meadow Land," much larger in extent, bounded on the west by the Vetluga and its tributaries, the Yuronga and the Usta, on the north by the Viatka, on the east by the Ilet, and on the south by the Volga and the Lower Kama. The number of the Tcheremis is given by Smirnoff as 312,591. The mountain-land is well clothed with woods of fir and pine, and possesses a very fertile soil, and its inhabitants, who are taller, more powerful, and handsomer than their lowland brethren, follow agricultural pursuits, while the meadow-land Tcheremis, 70 per cent. of whose territory is covered with forest, maintain them-

selves chiefly by the chase. Little in the villages of the Tcheremis is of native origin. Their houses, clothing, dishes, etc., are copied from their Russian or Tatar neighbours. A hut of thin planks, roofed with shingles and used as a summer dwelling, is a peculiarity of the Tcheremis' farmhouse, and the woman's dress shows some marks of originality. Polygamy still prevails among the pagan Tcheremis. Professor Smirnoff believes that it was not introduced through Mohammedan influence, but is a modification of hetairism, under which system all the women of the tribe were common property. In some districts it is still the practice to carry off a wife by force, and in others the customs observed at the marriage indicate its former existence. The purchase of wives succeeded to rape, owing to Turkish influence, the price being at first regarded as an expiation, as is indicated by the name it bears. The Tcheremis believe in a life after death, and credit the dead with the power of returning to the world. Accordingly, they place food and drink in the coffins, and on certain festivals prepare feasts for their departed relatives. In a child's coffin they place a string, on which is measured the height of the father or mother, at the same time expressing a hope that the child will grow up to be an efficient workman; and they lay bridal garments in the coffin of a girl. From the ranks of the dead are recruited a vast host of evil spirits: *e.g.* various kinds of fever are caused by the spirits of spinsters. The gods of the Tcheremis are also very numerous. There are the God of Heaven, the God of the Dawn, the Ruler of the World, the Mother of the bright Sun, and many others. All those deities, which stand in close relation to men, such as the gods who give rain, guard the cattle, and protect fruit and fish, are propitiated with sacrifices. At the present day, however, the Tcheremis offer part only of the victim—the head or heart—and in some districts substitute cakes made in the shape of a horse. The place of sacrifice is usually a grove, and is chosen by a supposed sign from the gods, such as the bursting forth of a new spring. Among the mountain Tcheremis the Greek Church has made considerable progress.

Deep-Sea Exploration in the Eastern Mediterranean.—The *Kölnische Zeitung* reports that the investigations which the expedition sent out by the Vienna Academy of Sciences has been carrying out in the eastern portion of the Mediterranean have been very successful, and have given important results. In all, the investigations concerning the depth and general characteristics of the sea, and the presence of life in it, were carried out at 72 distinct points. The greatest depth (3700 mètres, or over $2\frac{1}{4}$ miles) was found near the great depression which runs between Mola and Cerigo—a deep valley running in a north and south direction, and with a depth varying from 3500 to 4000 mètres, the descent being much more abrupt on the Greek side than on the Italian and Sicilian side. Experiments as to light showed that the waters are more transparent near the African coast than in the northern portions. There, white metal plates were discernible at a depth of nearly 144 feet. Sensitive plates were still found capable of being acted upon by light at a depth of nearly 550 yards, at a point 200 nautical miles north of Benghazi: on being drawn up they were found to have been blackened. The acid constituents of the sea-water seem to be the same at the greatest depth as near the surface, nor is any difference in the quantity of ammoniacal constituents perceptible between the upper and the lowest levels, with the exception that everywhere close to the bottom the quantity of ammonia is notable. The deep-sea region of the Eastern Mediterranean is very poor in animal life. A dredge at a depth of 3000 mètres brought up no animal specimens at all; but at a depth of 2000 mètres leaf-formed algæ were discovered similar to those found at the same depth in the Atlantic by the Plankton Expedition.—*Times*, 30th March.

ASIA.

Corea.—The climatic conditions in Corea are imperfectly known; but the *Annalen der Hydrographie* (I., 1891) publishes some valuable meteorological observations that were made at the Corean ports of Chimulpo, Juensan, and Fusan. The two latter lie on the east coast of Corea, and the former is on the west coast. The chief features of the Corean climate—if one may judge from observations extending over only three years—appear to be the following:—Atmospheric pressure at the three stations, mentioned above, is comparatively high from November to February (winter), and low from May to September (summer). Whilst the west coast is somewhat cooler than the east coast, the temperature of the air is rapidly lowered from south to north. The mean annual temperature is much the same as that of places on the same latitude on the east coast of North America. The summer temperatures at the three stations are much the same; but the winters at Chimulpo and Juensan are much colder than at Fusan. At Chimulpo the mercury fell below the freezing-point during the months of October to April; in Juensan, from October to March; in Fusan, from December to May. The mean temperature of the warmest months (July or August) was 26°·2 C. in Chimulpo, 26°·8 C. in Fusan and Juensan; and of the coldest months (January or February) 5° C. in Fusan, −4°·4 in Chimulpo, and 5°·1 C. in Juensan. The prevailing winds are of a monsoon character: on the east coast, easterly; on the west coast, south-westerly. The rainfall decreases from south to north, and is heavier on the east than on the west coast. The rainy season is in summer, the dry season in winter. In Juensan the rainfall was *nil* in January and February of the three observed years. There was no snowfall in Fusan.

Burma.—Major A. B. Fenton has sent us some corrections to the Note we published in February. The Indaw Chaung, he says, is deep enough, but the channel is hard to find when the country is flooded, as it always is in the rainy season. It is its tributary, the Nantein Chaung, which was only waist-deep (about a mile above its mouth), and it is owing to the influx of the waters of this stream in time of flood that the Indaw Chaung flows backwards into the lake. Major Fenton also states that hardly any Shans are found on the Upper Irrawadi, but that this country is the home of the Kachins.

British North Borneo.—Last year Mr. H. R. J. Dunlop traversed North Borneo from the Kinabatangan River to the Padas River, his route lying further to the south than that of any former travellers who have crossed the territory. Leaving Pinungah on the Kinabatangan on July 26th, Mr. Dunlop ascended the Melian to its tributary the Pinga, and, employing small boats, navigated the latter for some distance. The stream was 30 to 40 feet broad, but its numerous rapids soon rendered navigation irksome; so the party commenced its overland march. As they marched north-westwards, the land gradually rose, and on August 6th the aneroid indicated a height of 1800 feet. Further on they found the country level. They passed a swampy hollow, and at the end of the day's march they perceived, at a distance of 10 or 12 miles towards the north, the large chain of hills known as the Tadus si Madi, which runs in a north-easterly direction, and contains the sources of three large rivers,—namely, the Melian, the Labuk flowing to the east coast, and the Pagalan running into the Padas on the west. A few days later, Mr. Dunlop entered the great Limbawan plain, and, crossing the Pagalan, came to a much-frequented road leading to the Kimanis River. On the 22d he arrived at Mempakol.—*Petermann's Mitt.*, Bd. xxxvii. No. 2.

Irrigation in Central Asia.— Captain A. C. Yate, our Hon. Corr. Member, has sent us the following communication :—"The chief essential condition of prosperity in Central Asia is water—that is, irrigation ; for rain cannot be "made to order." General Annenkoff knows this well. Probably no one has contributed more to progress in Central Asia than Annenkoff. He makes railways, promotes commerce, starts wine-factories and horse-breeding on his own account, builds schools and churches, etc. However, as to irrigation, the Galodnaya Steppe, from Jizak to the Sir-daria is sure to be irrigated ere long from the Sir-daria, and a canal from the Oxus near Kilif, to Bokhara *viâ* Karshi is also proposed. The irrigation-works, however, at Bairam Ali and Merv are the ones to which special attention is devoted. It is curious now to take up Burnaby's *Ride to Khiva* and read (preface, p. vii) : "Merve . . . is richer than any of the most fertile corn-growing countries in European Russia." We know that Merv neither is, nor is ever likely to be, a very rich or populous place. The soil may be magnificent, but more water is wanted. After the wants of the Sarak and Teke Turkomans on the Murghab are supplied, there is not enough left even for the Imperial Domain at Bairam Ali. However, from what Sir Colin Scott Moncrieff says on this point, there is reason to believe that the irrigation of the Bairam Ali domain will be satisfactorily accomplished. The Maruchak Band should be in working order by this time, and, if so, cultivation will be re-established between Yulatun and Panjdeh. The Zarafshan and the Tchirtchik amply supply Samarkand and Tashkent. Much, no doubt, can be done to improve the irrigation of the oases extending from Askhabad to Sarakhs, but scarcely until the mountains that border Khorasan on the north become Russian."

AFRICA.

Great Britain and Italy in East Africa.—The Protocols between the British and Italian Governments for the demarcation of their respective spheres of influence in Eastern Africa, which were signed at Rome on March 24th and April 15th, were presented to Parliament on 6th May. The Protocol of March 24th is as follows :—

"The Undersigned,—

The Marquis of Dufferin and Ava, Ambassador of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, Empress of India ; and the Marquis de Rudini, President of the Council and Minister for Foreign Affairs of His Majesty the King of Italy ;

After careful examination of the respective interests of the two countries in Eastern Africa, have agreed as follows :—

I. The line of demarcation in Eastern Africa between the spheres of influence respectively reserved to Great Britain and Italy shall follow from the sea the mid-channel (Thalweg) of the river Juba up to latitude 6° north, Kismayu with its territory on the right bank of the river thus remaining to England. The line shall then follow the 6th parallel of north latitude up to the meridian 35° east of Greenwich, which it will follow up to the Blue Nile.

II. If future explorations should hereafter show occasion, the line following the 6th parallel of north latitude and the 35th degree of longitude east of Greenwich, may, by common agreement, be amended in its details in accordance with the hydrographic and orographic conditions of the country.

III. In the station of Kismayu and its territory there shall be equality of treatment between the subjects and protected persons of the two countries, in all that

relates to their persons, their goods, or to the exercise of any kind of commerce and industry.

Done at Rome, in duplicate, the 24th March 1891.

(L. S.) Dufferin and Ava.
(L. S.) Rudini."

The following is the Protocol of April 15th, 1891 :—

"Being desirous of completing, towards the north as far as the Red Sea, the demarcation of the respective spheres of influence of England and Italy, which the two Parties have already agreed on by the Protocol of the 24th of March last, from the mouth of the Juba in the Indian Ocean to the intersection of 35° east longitude, Greenwich, with the Blue Nile, the Undersigned :

The Marquis of Dufferin and Ava, Ambassador of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, Empress of India ; the Marquis de Rudini, President of the Council and Minister for Foreign Affairs of his Majesty the King of Italy ;

Have agreed as follows :—

I. The sphere of influence reserved to Italy is bounded, on the north and on the west, by a line drawn from Ras Kasar on the Red Sea to the point of intersection of the seventeenth parallel, north, with the thirty-seventh meridian, east, Greenwich. The line, having followed that meridian to 16° 30′ north latitude, is drawn from that point in a straight line to Sabderat, leaving that village to the east. From that village the line is drawn southward to a point on the Gash 20 English miles above Kassala, and rejoins the Atbara at the point indicated as being a ford on the map of Werner Munzinger "Originalkarte von Nord Abessinien und den Ländern am Mareb, Barca, und Anseba, 1864" (Gotha, Justus Perthes), and situated at 14° 52′ north latitude. The line then ascends the Atbara to the confluence of the Kor Kakamot (Hahamot), whence it follows a westerly direction till it meets the Kor Lemsen, which it descends to its confluence with the Rahad. Finally, the line, having followed the Rahad for the short distance between the confluence of Kor Lemsen and the intersection of 35° east longitude, Greenwich, identifies itself in a southerly direction with that meridian, until it meets the Blue Nile, saving ulterior amendment of details, according to the hydrographic and orographic conditions of the country.

II. The Italian Government shall be at liberty, in case of being obliged to do so by the necessities of the military situation, to occupy Kassala and the adjoining country as far as the Atbara. Such occupation shall in no case extend to the north nor to the north-east of the following line :—

From the right bank of the Atbara, in front of Gos Rejeb, the line is drawn in an easterly direction to the intersection of the thirty-sixth meridian, east, Greenwich ; thence, turning to the south-east, it passes 3 miles to the south of the points marked Filik and Metkinab on the above-mentioned map of Werner Munzinger, and joins the line mentioned in Article I. 25 English miles north of Sabderat, measured along the said line.

It is nevertheless agreed between the two Governments that any temporary military occupation of the additional territory specified in this Article shall not abrogate the rights of the Egyptian Government over the said territory, but that these rights shall only remain in suspense until the Egyptian Government shall be in a position to reoccupy the district in question up to the line indicated in Article I. of this Protocol, and there to maintain order and tranquillity.

III. The Italian Government engages not to construct on the Atbara, in view of irrigation, any work which might sensibly modify its flow into the Nile.

IV. Italy shall have, for her subjects and protected persons, as well as for their goods, free passage without duty on the road between Metemma and Kassala, touching successively El Affareh, Doka, Suk-Abu-Sin (Ghedaref), and the Atbara.

Done at Rome, in duplicate, this 15th of April 1891.

(L. S.) Dufferin and Ava.
(L. S.) Rudini."

AMERICA.

Geographical Results of the United States' Eleventh Census.—Mr. Henry Gannett, in charge of the Geographical work of the Eleventh Census of the United States, says (*Census Bulletin*, No. 23) that the areas of the States and Territories are identical with those published by the Tenth Census, excepting as they are modified by the following territorial changes:—(1) The formation of the Territory of Oklahoma; (2) the division of Dakota into North and South Dakota; and (3) the transfer of a small part of South Dakota to Nebraska. The gross area is 3,025,600 square miles, of which 2,970,000 is land-surface and 55,600 water-surface. According to the same authority (*Census Bulletin*, No. 33), the mean annual temperature of the United States, excluding Alaska, is 53°. The greatest density of population naturally centres on this pivot, ranging from 50° to 55°. From this, as a maximum, the density of population rapidly diminishes with the increase or decrease of temperature. The most rapid proportional increase has taken place at the two extremes, where it has trebled between 1870 and 1890, while at the same time it has increased but about 50 per cent. in the most densely settled group. The influence of rainfall (*v. Census Bulletin*, No. 32) is shown in the fact that the main body of the population inhabits the region in which the annual rainfall is between 30 and 50 inches, three-fourths of the inhabitants, or thereabouts, being found there. The arid regions of the West, where the rainfall is less than 20 inches—a region which comprises two-fifths of the entire area of the country—contains at present less than three per cent. of the population. The most rapid increase, however, has been where the rainfall ranges from 20 to 30 inches; that is, in the eastern portion of the great plains ranging from Texas to Dakota, where the density has increased in twenty years from 1·6 to 8·1.

Mr. Gannett further says (*Census Bulletin*, No. 34) that the centre of population in 1890 was in latitude 39° 11′ 36″ and longitude 85° 32′ 53″. It rests in Southern Indiana, at a point a little west of south of Greensburg, and twenty miles east of Columbus, Indiana. In the year 1790 the centre of population was at 39° 16·5′ N. lat. and 76° 11·2′ W. long., or about 23 miles east of Baltimore. Between 1790 and 1800 it moved almost due west to a point about 18 miles west of the same city. From 1800 to 1810 it moved westerly and slightly southward to a point about 40 miles NW. by W. from Washington. From 1810 to 1820 it moved westward, and again slightly southward, to a point 16 miles north of Woodstock, Va. From 1820 to 1830 it moved still further westward and southward to a point about 19 miles SW. of Moorefield, W. Va. From 1830 to 1840 it moved still further westward, but slightly changed its direction northward, reaching a point 16 miles south of Clarksburg, W. Va. From 1840 to 1850 it moved westward and slightly southward again, reaching a point about 23 miles SE. of Parkersburg, W. Va. From 1850 to 1860 it moved westward and slightly northward, to a point 20 miles south of Chillicothe, Ohio. From 1860 to 1870 it moved westward and sharply northward, reaching a point about 48 miles E. by N. of Cincinnati, Ohio. In 1880 the centre of population had returned southward to nearly the same latitude which it had in 1860 (39° 4·1′). During the past decade

it moved northward into practically the same latitude it occupied in 1870. The closeness with which the centre has clung to the parallel of 39° cannot fail to be noticed. The most northern point reached was in 1790, the most southern in 1830. The extreme variation in latitude has been less than 19 minutes, while the movement in longitude has been nearly 9·5 degrees, or a total westward movement of 505 miles.

The centre of the area of the United States, excluding Alaska, is in Northern Kansas, in about lat. 39° 55′ and long. 98° 50′. The centre of population lies, therefore, about three-fourths of a degree south, and more than 17 degrees east, of the centre of the area.—*Bull. of the American Geogr. Soc.*, 31st March 1891.

United States : Statistics of Indians.—The Department of the Interior (Census Office) publishes a report, under date 19th January 1891, containing statistics of Indians residing within the jurisdiction of the United States (except Alaska), and a statement showing Indians taxed or taxable and not taxed. Although, in the final volume of the Census reports, full and complete Indian statistics may be expected, some of the facts contained in the preliminary bulletin are worth recording. The total Indian population of the United States, exclusive of Alaska, but including 32,567 counted in the general census, being the taxed or taxable Indians, numbers 249,273. The following table gives the division of the Indians in detail :—

Indians on reservations or at schools, under control of the Indian Office (not taxed or taxable),							133,382
Indians incidentally under the Indian Office, and self-supporting :							
The Five Civilised Tribes, Indians and coloured :							
Cherokee Indians,	25,357	Coloured,	4,242	Total,	29,599		
Chickasaw Indians,	3,464	do.,	3,718	do.,	7,182		
Choctaw Indians,	9,996	do.,	4,401	do.,	14,397		
Creek Indians,	9,291	do.,	5,341	do.,	14,632		
Seminole Indians,	2,539	do.,	22	do.,	2,561		
					68,371		
Deduct number of coloured persons probably not members of tribes (estimated),					3,500		64,871
Indians other than Chickasaws in that nation,							1,161
Indians other than Choctaws in that nation,							257
Population of the Five Civilised Tribes :							
Indians,					52,065		
Coloured Indian citizens and claimants,					14,224		
Total,					66,289		
Pueblos of New Mexico,							8,278
Six Nations, Saint Regis, and other Indians of New York,							5,304
Eastern Cherokees of North Carolina,							2,885
Indians taxed or taxable, and self-sustaining citizens, counted in the general census (98 per cent. not on reservations)							32,567
Indians under control of the War Department, prisoners of war (Apaches at Mount Vernon barracks),							384
Indians in state or territorial prisons,							184
Total,							249,273

The number of Reservation Indians engaged in agriculture for a livelihood is

smaller than that of those who obtain a living through root-digging, hunting, fishing, or horse-trading. The Navajos are entirely self-sustaining as sheep and horse raisers. The increase in the number of ration Indians, says the Report, can only be prevented by the Reservation Indian becoming more of an agriculturist or a herder of his own cattle or horses.

French Guiana.—M. H. Coudreau has explored the seven chief affluents of the Oyapock River. His surveys of new country extend over 430 miles, besides which he has surveyed 235 miles along the Oyapock. The country he traversed is very swampy and of dreary aspect. Ruined Indian settlements are found everywhere, and measles and dysentery work such havoc among the natives, that, before another generation has passed away, the south-eastern region will probably be bereft of its inhabitants. M. Coudreau intends to follow up the river to its source, cross the southern part of the Tumuc-Humac Mountains, and visit the Indians dwelling by the sources of the Tapahoni.—*Verhand. der Gessell. für Erdkunde zu Berlin*, Bd. xviii., No. 1.

AUSTRALASIA.

New Guinea.—According to the Melbourne *Age* of 24th February last, the expedition of a number of members of the Royal Geographical Society of Australasia, which started for Port Moresby on the 14th November 1890, to explore in New Guinea, reached Mount Yule on 24th February last. The party consisted of Sir W. Macgregor, the Administrator of British Guinea; Mr. George Belford, leader; Mr. Nettle, a practical miner; Mr. Harry Nine, Mr. Peter, Lifu Said and Anthony (Malays), and eleven Papuans. On Saturday, 25th February, Mr. A. C. Macdonald, Hon. Sec. of the Society at Melbourne, received a telegram which read as follows:—

"Expedition reached top of Mount Yule. Weather very unfavourable. I am sending you specimens of rocks and plants; the collections are small, botanical: the best report will follow. Party returned all well."

The expedition is subsidised by the Victorian Branch of the Society to the extent of £300.

The Southern Alps of New Zealand.—This chain has always been supposed to form an impregnable barrier between the east and west coasts of the Middle Island, extending from the head of the Rakaia River to the Haast River. Mr. Brodrick, however, while engaged in the survey of Canterbury, discovered two routes by which the range may be crossed—the Sealy Pass, at the head of the Great Godley Glacier, and a saddle between the Huxley and Landsborough Rivers. He commences his narrative, in an appendix to the *Report of the Survey Department for the Year* 1889-90, at the Tekapo Lake, a sheet of water lying at an altitude of 2321 feet above sea-level in country entirely destitute of trees, except where a few willows grow round the homesteads of the run-holders. Its waters are of a slaty colour, owing to the fine silt washed into it by the Godley River. From the head of the lake a fairly good road leads to the Lilybank station, but beyond this the only route is along the bed of the river. About 29 miles from the lake the face of the Godley Glacier, which is situated at an elevation of 3407 feet, is reached. After marching 7 miles more over the glacier, the latter part of the way through deep snow, Mr. Brodrick arrived at the top of the Sealy Pass, 5800 feet high, and descended the western side till he had left the snow and all the difficulties of the route between the pass and the Waratoa River behind. The pass is named after a surveyor, Mr. E. P. Sealey, who visited it in 1891.

The route to the other, the Huxley Pass, starts from a station at the north-east end of the Ohau Lake. This lake lies at a height of 1717 feet above sea-level, and is surrounded by steep hills, the dull-brown colour of which is relieved by clumps of elegant birches (*Fagus cliffortioides*). Following the Hopkins River, Mr. Brodrick ascended to a point in the angle between it and the Hunter River, from which he could look over the pass, and get a view of the sea on the west coast. He afterwards crossed the pass, and reached the river Landsborough eight hours after leaving his camp, near the fork of the Huxley. The pass is 5529 feet high, and is situated in latitude 43° 57′ 50″ S., and longitude 169° 44′ 20″ E. Mr. Brodrick believes that the track across could never be made more than a passable footpath. A small map sent by the Survey Department of New Zealand shows the configuration of the country between the lakes and the passes.

GENERAL.

The Teaching of Geography.—The encouragement of improved methods of teaching Geography has been one of the aims of the Royal Scottish Geographical Society since its foundation. An Education Committee, specially intrusted with this subject, forms one of the Standing Committees of the Council. For several years past the Committee has held annual examinations in Geography of the pupils of primary and secondary schools at various centres over the country: the successful candidates have received the Society's certificates, and the best of them also prizes. As a further means of improving the teaching of Geography, the Committee has instituted courses of Model Lectures on Geographical Subjects, open to members of the Society, and also to teachers, on payment of a nominal fee. The first course was delivered by Dr. H. R. Mill during January, February, and March, his subject being "The Earth and Man: a Study in Advanced Geography." The average attendance at the weekly lectures was about one hundred; and they were in all respects successful. The Committee has been so greatly impressed with the value and the success of this experiment, that it has advised the Council to suspend in the meantime the examinations of scholars, and to give every encouragement to the Lecture Scheme. To this the Council has agreed.

The Ninth "Deutscher Geographentag."—We have been favoured by Miss Maria M. Ogilvie, B. Sc., with the following report:—

"Seldom can any scientific congress be surrounded by such genial influences as fell to the fortune of the Geographentag this year in Vienna. To the professors and scientific men hailing from all parts of German-speaking Europe, and tired with the work of the winter Session, there was something peculiarly fresh and invigorating in this, their first meeting on Austrian soil.

"The meetings of the Geographentag were held in the 'Aula' of the University, a hall adorned with the taste and elegance characteristic of all the new buildings in the Ringstrasse. The opening ceremony of the 1st April was rendered brilliant by the predominance of military and court dress, and the profusion of decorations. Words of welcome were spoken by the Honorary President, Count von Gautsch, Austrian Minister of Education. The Lord Mayor, Dr. Prix, then invited the members and guests of the Geographentag to a reception in the Rathhaus the same evening. Among the guests there were present—Prince Gustav of Saxe-Weimar-Eisenach; the State Ministers of War, of Commerce, of Foreign Affairs, of Home Affairs, of Finance; the German Ambassador, Prince von Reuss; the British Ambassador, Sir Augustus Paget; the Japanese Ambassador; the President of the Academy of Science, etc. etc.

"Among the members some of the best known may be named—Hofrath von Hauer, President of the Geographical Society in Vienna; General von Arbter, head of the Military Geographical Institute; Professor Tomaschek, Professor Penck, Dr. Diener, who were the more active members of the Geographentag committee; Professor Suess (Vienna), Director Neumayer (Hamburg), Professor Baron von Richthofen (Berlin); Professors Wagner (Göttingen), Brückner (Bern), Richter (Graz), Günther (Munich), Lenz (Prag), Fischer (Marburg); and the travellers Dr. Junker, Count Pfeil, Dr. Baumann, and Lieutenant von Höhnel.

"Hofrath von Hauer, in a few words, initiated the actual proceedings of the Geographentag; and the first paper was then read by Director Neumayer on 'Magnetic Surveys.' In it, after referring to what he had said two years ago in the Geographentag at Berlin, Dr. Neumayer emphasised the importance of building more stations for observations in terrestrial magnetism, and particularly secular changes, as only by the definite results obtained from a multiplicity of observations made over a vast extent of country, and during a protracted period of time, could the laws governing these changes be determined and the lines of equal magnetic force be rightly drawn. Splendid results had been obtained in the British Islands, but the country was of too limited an extent to justify general conclusions. He suggested an international congress for special consideration of the earth's magnetism in respect of the methods, the observations, and the construction of charts.

"Professor Penck has been engaged for some time in preparing a new book on the 'General Morphology of the Surface of the Globe,' and in his discourse gave an outline of the main principles. These he seeks for rather in outward forms than in genetic causes—for example, the depressions of a mountain range betray its main characteristics, and their excavation in relation to the strike is of more importance than the actual elevations. Chiefly to be distinguished are hollows (*Höhlungen*), in which the change of level is abrupt, and slopes (*Abdachungen*) which sink gradually to sea-level, and give rise to two leading forms of landscape—(1) the familiar valley landscape, and (2) the less common basin landscape.

"Perhaps the most important paper of the Geographentag was that of Lieut.-Col. Sterneck (Mil. Geogr. Inst., Vienna) on 'Variations of Gravity (*Schwerestörungen*) and Deviations of the Plumb-line (*Lothabweichungen*).' It may be well to refer to it in some detail. In determining the true form of the Earth's surface, the so-called Geoid, it is simplest to make use of the Ellipsoid as the mathematical basis of calculation. The direction of the plumb-line at the places of observation is other than it would be on a perfectly ellipsoidal surface, and the divergence affords a ready means of laying down the actual form. The variations of the plumb-line may be either regional or local, and seem to indicate an irregular distribution of mass in the Earth's crust. In the neighbourhood of mountains, as would naturally be expected, the plumb-line turns from its normal position towards the mountains; but it is a remarkable fact that the observations nearly always show a smaller deviation than a calculation based on the size of the masses causing it would give. An extreme case was observed at Pisa, where the plumb-line actually turned towards the west, as if the mass of the Apennines repelled it. To explain such phenomena we are forced to assume that the underlying matter is of less than average density—an assumption in harmony with direct observations of gravity. Sterneck has invented an apparatus for making pendulum observations in a simple yet highly-satisfactory way, so that one day's observations will suffice for each place. With this he made measurements of gravity at a large number of points in the Tyrolese and Styrian Alps, across the central chain. The results of these observations have been worked out by Professor Helmert of Berlin, and are found to be similar, on the whole, to those of Pratt in the Himalaya, and of Russian observers

in the Caucasus, corroborating the opinion that the substance under mountain ranges is deficient in amount, as, for instance, in the Alps also. When all observations are reduced to sea-level standard, the gravity is less than the normal. Such deficiencies of mass do not of course postulate the occurrence of hollows in the Earth's crust, but only portions of somewhat low specific gravity. What applies to the mountain-ranges is also, according to the observations, true of continents in general. Under them the Earth's crust shows less solidity than under the ocean. We may here find an explanation of the increase of gravity on oceanic islands, previously attributed to shorter distance from the Earth's centre.

"Dr. Diener, who has just published a book on the Western Alps, gave a short description of the natural classification of the Alps. In opposition to the recent work of Böhm, he thinks that the truest principle of arrangement is found, not in the outward form of the chain or its geognostic composition, but in the internal convolutions. In describing the geological relations, he drew attention particularly to the natural line of separation between the West and East Alps afforded by the Vorderrhein-Tessin fault, where the different zonal strips of the West Alps are broken across the strike, and near which the East Alps, in bending southwards, form on their north-west edge a convex arch similar to that so strikingly presented by the Western Alps.

"Baron von Toll related, in a highly interesting paper on the 'Investigations in N.-E. Siberia,' some of the results of the recent Russian expedition to these islands, in which expedition he himself took an active part. He explains the original statement of the discovery of the mammoths, *au milieu de glaçons*, by the fact that they are always found in masses of mud and clay pressed into broad fissures of the bottom-ice, or, as he proposes to call it, the *Stein-eis*. He confirms Penck's supposition regarding the age of the *Steineis*, believing it to be the remains of enormous masses of ice belonging to the Glacial Period,—a point specially interesting in connection with the discovery in recent years of the 'fossil glacier' in Alaska. That a rich fauna may have lived on the edge of these ice-masses is highly probable, while, to account for its destruction, Toll, instead of assuming any sudden invasion of Polar ice, suggests the gradual sinking of the northern coasts, and the consequent gradual diminution of the land whence the animals derived their nourishment.

"Some special points of *Physical Geography* were discussed in the papers of Professor Richter, Count Zeppelin, Professor Brückner, and Dr. Sieger.

"Professor Richter has been for some years making observations on the temperature of the Austrian mountain-lakes, and especially of the Wörth-See, in Carinthia. He gave some interesting new results bearing on vertical circulation and the seasonal variation of temperature in surface-layers.

"Count Zeppelin, Director of the Commission for the Scientific Investigation of Lake Constance, reported on the general programme and methods of work, and referred in some detail to the course of the Rhine current (which can be easily traced through the lake even within 7 miles of its outflow), and to the unusually level nature of the Lake-basin.

"Professor Brückner read a paper 'On Fluctuations of Level (*Schwankungen*) in Seas and Lakes.' He noted first the horizontal rise and fall as determined mainly by climatic and local conditions, and compared the time required to return to a position of equilibrium in the cases of lakes with, and lakes without, outlets, the latter depending for the removal of the surplus water entirely on the surface evaporation. For example, Lake Constance rises to its maximum level almost simultaneously with the summer influx of the glacier-waters of the Rhine, whereas the Caspian Sea does not reach its maximum till two and a half months after the

spring maximum of the Volga waters. He then spoke of the variations of level frequently found in water-surfaces, and occasioned by differences in air-pressure, by wind, or by the varying specific gravity of the water itself, as in the case of salt lakes, where, in the neighbourhood of river-mouths, the water is less salt and therefore lighter. These remarks he illustrated by observations in the Baltic Sea, the Black Sea, and the Atlantic Ocean. Brückner rejects the general axiom enunciated by Suess in his recent work, *Das Antlitz der Erde*, that 'the Earth's crust sinks and the sea follows,' affirming that every case of relative change of level demands individual examination. In his paper he referred to the case of the Baltic Sea, where, on the Swedish and Finland coasts, the differences of level can be explained by none of the before-mentioned causes, and said that here he believed the land to have actually risen.

"This opinion of Professor Brückner was supported in a paper read by Dr. Sieger, who had independently carried out a long series of observations on Scandinavian lakes and coast-lines.

"Three papers were devoted to the consideration of the *Means of Geographical Education in Schools* :—(1). By Dr. F. Umlauft (Gymnasium, Vienna), on 'The Geographical School-Cabinet'; (2) by Professor Klar (Realschule, Sternberg), on 'Relief-Maps as an Aid in Schools,' communicating the details of a simple method by which good and useful reliefs were made by him for use in schools ; (3) by H. Poruba (Bürgerschule, Vienna), chiefly advocating the value of such a practical institution as the 'Urania' in Berlin, where the best apparatus and aids to scientific education were open not only to students, but to the general public.

"Another group of papers, which can only be mentioned here, dealt with the 'Present Condition of our Geographical Knowledge of the Balkan Peninsula,'—a well-chosen theme, and one specially interesting to Austria. Professsor Toula spoke of the geological structure ; Lieut.-Col. Hartl reported on the surveys now being made in various districts, with great success, by the Austrian military topographers ; while Dr. Philippson (Berlin) read a paper on 'The Mountain-structure of the Peloponnesus,' a country whose geology is but little known, and concerning which Dr. Philippson has given much new and important information.

"The principles and advantages of Photogrammetry were very clearly expounded by Professor Steiner of the Hochschule in Prag. The photographs, with the plans and maps calculated from them, as well as the necessary apparatus, were all to be seen in the Geographical Exhibition.

"The Geographical Exhibition was displayed partly in the 'Aula,' but chiefly in the spacious suite of rooms adjoining it, and in the corresponding suite on the other side of the handsome marble-staircase of the University. So extensive was the Exhibition that we can merely indicate the main departments and more striking features. In the Historical Department, the development of cartography was illustrated by a series of maps extending from the middle of the fifteenth century to the present day. The old maps, portraying sometimes the whole of Austria-Hungary, sometimes individual towns and fortresses, were often curiously pictorial in character, and, with the help of perspective and well-marked light and shade, attained wonderfully realistic effects. The present time was worthily represented by the brilliant workmanship of official maps prepared in the Royal Military Geographical Institute. Among cartographical curiosities belonging to the Vienna collections were some of the original maps of such geographers as Nicolotti, Ptolemy, and Mercator, while in the *Hofbibliothek* the original of the 'Tabula Pentingeriana' was exhibited. The Geographical Landscape Department called forth the most general interest, by reason both of the variety and the merit of the exhibits. Some of the water-colours were most artistic in execution, notably the

East Indian and Japanese views of Baron von Ransonnet, the Chinese and Japanese landscapes of Baron von Stillfried, and the Ceylon landscapes and plant studies of Baron von Königsbrunn. Of photographs, those of Professor Simony must be placed in the first rank of landscape-photography. Simony has for the last twenty years made a particular study of photography as applied to elucidating geographical and geological facts, and in his views of the Dachstein region, the Gosau glaciers, and other Alpine features, he has been remarkably successful. The exhibits in this Photograph Department were very numerous : we may mention those of the floods of 1882 in the Tyrol, and of Alpine glacier-scenery, exhibited by the Austro-German Alpine Association ; those of Lebanon and Antilebanon, by Dr. Diener ; of the Teleki African Expedition, by R. von Höhnel ; of Montenegro, by Professor Wünsch (Pilsen) ; and of the Polar Regions, by Julius von Payer.

"In the Mathematical Geography Department, there was a large and well-arranged selection of instruments, charts, maps, books, globes, etc. The school maps were chiefly exhibited by Artaria and Co., Hölzel of Vienna, and by some of the best-known German firms. Professor Schmidt of the Gymnasium showed some beautiful apparatus, serving to demonstrate to young students the more complicated questions of the study of mathematical geography. A small machine, made by a Dresden mechanic, was especially attractive : it represented the apparent path of the sun in the heavens in a most perfect way. The sounding-apparatus and the thermometers used by Simony, as far back as forty years, were there ; but the gem of the department was Sterneck's carefully-made collection of all the instruments to which we owe our present knowledge of 'gravity' and of local changes above and below the Earth's surface. In his own apparatus Sterneck has elaborated the old pendulum principle ; so that now for the first time it is possible to measure exactly the differences of attraction exerted by the Earth's mass on a point at the upper and lower end of a mine-shaft.

"The Emperor of Austria spent a couple of hours one afternoon in the Geographical Exhibition, and showed great interest in the various departments. At the close of the Geographentag, the Exhibition was thrown open to the public.

"The evening entertainments passed off with great spirit, Vienna doing itself every credit in the courteous and generous hospitality extended, both publicly and privately, to strangers. For many, the pleasantest memories of all will centre round the excursions, which were peculiarly happy in their selection and arrangement. There was Kahlenberg, in the near vicinity of Vienna, to be climbed, and Sonnenwendstein, a high peak near Semmering, which commands a magnificent view of E. Alpine scenery and the Vienna valley ; for the favoured few, who still had time to spare, an excursion of several days' duration was planned to Budapest, where the travellers were received by Professor Loczy, President of the Geographical Society, and thence to Fiume, Pola, Trieste, and the Karst district."

MISCELLANEOUS.

Dr. G. W. Leitner commences in the April number of the *Asiatic Quarterly Review* a rough account of itineraries in the neutral zone between **Central Asia** and India.

Dr. Paul Ehrenreich publishes in *Petermann's Mitteilungen* (iv. 1891) the first part of what promises to be a valuable paper on the division and distribution of the indigenous tribes of **Brazil.**

Dr. Catat's paper on **Madagascar,** which was read at a meeting of the Paris Geographical Society on 23d March last, is published in the *Compte Rendu* (7 and 8, 1891), and is accompanied by a map of the island.

The *Revue Française* (May, 1891) contains a brief *exposé* of the claims of France to the territory, in dispute with the Congo Independent State, on the **M'bangi-Wellé**. It contains also a paper by M. Ribot on slavery in **Tunis**.

Mr. James Glaisher publishes in the *Quarterly Statement* (Jan. 1891) of the Palestine Exploration Fund some useful tables illustrating a comparison between atmospheric pressure in **Palestine** and in England, in the ten years ending 1889.

The *Izvestiya* of the Russian Geographical Society, Part II., 1890, contains a complete map of **Captain Grombtchevsky's Travels**. Unlike the sketch-maps previously published, the present one has a network of meridians and parallels, so that the relative positions can be determined from it.

The *Mouvement Géographique* (22d March and 19th April 1891) publishes information concerning the formation in Brussels of a commercial company for the exploitation of **Katanga** (M'siri's kingdom), together with an *exposé* of the claims of the Congo Independent State to that country. The former issue is accompanied by a map.

Captain Stairs, acting on behalf of an Anglo-Belgian Syndicate, has left England with the object of conducting an expedition from Zanzibar to **Katanga**. The main object of the expedition is to "take possession" of Katanga, an auriferous region which, having recently been exploited by agents of the Congo State and the British South Africa Company, is still in dispute between them, as regards priority and validity of legitimate claims.

The *Bulletin* (4ème Trim., 1890) of the Paris Geographical Society publishes the following serviceable papers:—Journey in **Central Asia** and to the Pamir, by Gabriel Bonvalot; the Pamir and Chitral (with a map), by Guillaume Capus; M. Paul Crampel's journey north of the **French Congo** (with a map), by L. Mizon; and the concluding portion of a paper by Dr. Nicolas Severtzow, referring to the old itineraries across the **Pamir**.

The Sixth Report of the Committee of the British Association appointed to investigate the physical characteristics, language, and industrial and social condition of the North-Western Tribes of the Dominion of **Canada**, has been published. Dr. Boas contribes the bulk of the report on the tribes of British Columbia. This is accompanied by a linguistic map, and preceded by remarks on British Columbian ethnology by Mr. Horatio Hale.

Dr. Konrad Ganzenmüller has published in the *Zeitschrift für wissenschaftliche Geographie* (Bd. viii. Heft 1) a learned and able paper illustrating his hypothesis that the **Ukerewe**, or Victoria Nyanza, is identical with the Eastern Nile sources of Ptolemy, with the "Crocodile Lake" of an unknown Greek writer, and with the "Kura Kavar" of the Arabs, and that fairly accurate knowledge of the territory of the Nile sources was formerly possessed, but subsequently was lost.

The Harbour of Saloniki is threatened with the same fate as that which has befallen Smyrna. Owing to the alluvial deposits of the Vardar, the harbour is becoming useless as a trading port; the entrance through the sandbanks is very difficult; and the delta of the river has advanced to the neighbourhood of Cape Kara-Burun. The prospective value of Saloniki to Austria-Hungary may therefore be questioned.—*Mitt. der K. K. Geogr. Ges. in Wien*, Nov. 1, 1891.

The recent census of **Bengal**, says the *Times'* correspondent, in his despatch of 27th March, throws an instructive light on the sanitary condition of the province. The districts showing a decrease in population are mainly those where defective subsoil-drainage produces malaria. This is especially marked in parts of Nadiya and Jessor, and is due to the fact that the natural drainage-channels have been

blocked by injudicious cultivation, and the want of sufficient provision for a waterway in the construction of the railway.

Despatches from Port-of-Spain, Trinidad, says a "Dalziel" telegram of 9th April, state that some time ago Mr. Kaufmann, a mine-owner in the gold-fields of **British Guiana**, discovered a diamond mine, in which he collected 638 stones. He sent them to an expert in London for analysis, and has just received news to the effect that out of the entire number only five stones are of no value, the remaining 633 being genuine diamonds of pure "water." Lord Gormanston, the Governor of British Guiana, in a recent speech at the opening of the Legislature, referred to the diamonds as opening up a new and unrivalled source of prosperity for the colony.

NEW BOOKS.

The History of Sicily from the Earliest Times. By Edward A. Freeman, M.A., Hon. D.C.L., LL.D. 2 Vols.: Pp. 609 + 583. With Maps. Oxford: at the Clarendon Press, 1891.

These two volumes are the first instalment of a work which, for completeness of design and elaboration of treatment, will undoubtedly rank with the standard historical achievements of our time. Professor Freeman's attention was specially directed to Sicily when writing the history of the Norman Conquest of England; and his original intention seems to have been to give a companion-picture of the Norman Conquest of Sicily, treated from the special point of view of its analogy with that of Britain. But, in order to give their full significance to the events of the eleventh and and twelfth centuries, he has found himself obliged to go back to those earlier times, when the struggle between Saracen and Norman was foreshadowed by that of the Phœnician and Greek, and to demonstrate how the eternal "Eastern Question" may be taken as the characteristic motto of Sicilian history.

From its geographical position as the central island of the Mediterranean, placed midway between Europe and Africa, Sicily invited colonisation from the earliest times. Its history, in one sense, may be called a history of colonisation; for, though the meeting-place and battle-field of many Powers, it has never become the home or the chief seat of any one nation. The island took its name from one section of its inhabitants, but its historic interest came from other sources, and its greatness was due to settlers from other lands. Though in this sense a secondary history, existing mainly in its relation to that of other countries, yet, on the possession of Sicily, so large an issue was at stake—the supremacy of the Aryan or Semitic race on the Mediterranean—that its importance can hardly be over-rated.

Professor Freeman's account of the geography of Sicily is in itself a complete and valuable monograph. He points out how the compactness and quasi-continental character of the island, with its long range of coast and mountainous interior, determined the nature of its settlement,—the native races retiring to inland heights as Phœnician and Greek colonies arose on the seaboard. Etna and the lesser volcanic seats of disturbance, actively at work from the earliest times, played a peculiar and important part in the physical and historical development of Sicily; whilst the native religion derived its special characteristics from the phenomena connected with the powers of the under-world. In the legend of Demeter and Persephone we have the most familiar example of this aspect of Nature-worship, which, though enriched and adorned by Greek imagination, was essentially local in its origin.

In spite of the scanty materials at command, an account of the earliest-known inhabitants of Sicily (the Sikans, Sikels, and Elymians) is given in considerable

detail. This is succeeded by a lengthy and exhaustive chapter on the Phœnician settlements in Sicily—at first independent, and later mere dependencies of Carthage. Here, as elsewhere, Professor Freeman illustrates his meaning by a wealth and variety of historic parallel, which gives a special and universal interest to every section of his work. The analogy between Cyprus and Sicily, the contrast between Sardinia and Sicily, the study of Carthage as a type of the "ruling city" compared with Athens, Rome, and Venice—all these sketches are in the highest degree suggestive and instructive. When we come to the description of the Greek settlements, the foundation of Naxos recalls the landing at Ebbsfleet in Britain, though in other respects the Greek colonisation of Sicily has more in common with the English settlements in America in the seventeenth century than the English settlements in Britain in the fifth and sixth. The history of Syracuse and the Sicilian Greeks occupies the remainder of the first volume and the whole of the second, up to the beginning of Athenian intervention in Sicily.

The text is fully illustrated with one large general, and many small sectional, maps; and the voluminous appendices add largely to the value of the work as a book of reference. We admire the systematic and orderly way in which the material is handled, the side-notes and digest of contents affording considerable assistance to the reader.

Denmark. Edited by H. Weitemeyer. With a Coloured Map. London: W. Heinemann. Copenhagen: A. F. Höst and Son. Pp. 268.

Mr. Weitemeyer has made an earnest, and on the whole highly successful, attempt to present to English eyes a picture of the interesting little country of which he is a patriotic son. With the aid of competent assistants, he describes Denmark and the Danes from many points of view. The history of the kingdom is sketched from the period of the "kitchen middens" down to the general election of last year, the political bearings of which are, we fear, as obscure to the average Briton as the prehistoric annals of the Cimbric peninsula. The editor also contributes a detailed account of the topographical features of the land, and the traits of the people, followed by briefer notices of the Danish dependencies and colonies. Here, as nearly everywhere, we stumble upon the geographer's bugbear—the spelling of place-names. Mr. Weitemeyer naturally and rightly prefers the native names and orthography. But there are some that come too late for easy acclimatisation, the more especially that the correct Danish reading is often uncouth to the English eye. Copenhagen will hardly consent to yield place to "Kjöbenhavn;" and in "Jylland" and "Fyn" it is not easy to recognise the familiar Jutland and Funen. A protest might be raised against the adoption of "Ostersöen" and "Vesterhavet" for the Baltic and the North Sea, which are not Danish possessions; and the Great and Little Belt, as translations of the "Storebelt" and "Lillebelt" might be allowed to keep their places. Measurements of distances and areas also require some little revision and amplification to render them intelligible to the popular mind of the country. The description of Iceland as "A roundish island, about 350 kilom. from north to south, and 500 kilom. from west to east, the whole area 150,000 square kilom. (1900 square miles)" is, for example, not in terms that are universally understood among us. Valuable chapters are added by Mr. Weitemeyer's coadjutors on the Danish language and literature, Danish art and music, the Danish law and constitution, and Danish statistics and economics. There is a useful index and a coloured map which might well have been more detailed; and the volume is dedicated to the Princess of Wales.

New Light on Dark Africa: being the Narrative of the German Emin Pasha Expedition. Related by Dr. Carl Peters, the Commander of the Expedition. Translated from the German by H. W. Dulcken, Ph.D. London: Ward, Lock, & Co., 1891. Maps and Illustrations. 1 vol., pp. 597.

Among recent narratives of African travel we know of no book that can be compared with Dr. Peters' for sustained dramatic interest, and, incidentally, for the practical lessons it teaches African adventurers. It is not always pleasant reading—far from it; but, whether one is ready to condemn or to excuse the leader of the so-called German Emin Pacha Expedition, one cannot fail to recognise in him and in his deeds the Nemesis of African earth-hunger. The expedition was, in the first instance at least, a legitimate undertaking inspired and promoted by the generous thought and support of the German people; but political intrigues and subsequent events gave to it the filibustering character which robbed it, not only of glory, but even of its legitimate ends. Unexpected opposition at home and abroad eventually confronted Dr. Peters, who, in consequence, had to adopt methods that were in themselves reprehensible, but which, undoubtedly, were partly forced on him. It became a question whether, in spite of all opposition and the waning necessity of carrying relief to Emin Pacha, the expedition should be abandoned, or whether it should be proceeded with in the hope of some ultimate humanitarian or political benefit arising therefrom. Dr. Peters can scarcely be blamed for adopting the latter alternative. From a man of his determination, enthusiasm, fertility of resource, and patriotism, nothing else could have been expected.

The main incidents in the expedition are sufficiently known to our readers to obviate the necessity of further allusion to them in this place. With a mere handful of men, Dr. Peters adventured to the relief of his countryman on the Upper Nile by a route which in a measure was forced on him, but, still, by a route which was supposed to be impassable to even a strong expedition like that under Mr. Stanley. Obstacles met him at every step; but these he swept aside with a relentless determination and an indifference to suffering—for himself, for his men, and especially for his enemies—which some are ready to condemn and some to extol. For our part, we cannot approve, or even excuse, many of the uncalled-for cruelties and raids in which he and his companions engaged, except on the ground that he was a political outcast. Dr. Peters' method partook too much of the "blood-and-iron" policy to be held up as an example to future African travellers. He affects to scoff at the conciliatory methods of Thomson and other predecessors in the same field; and he considers that it is for the ultimate benefit of Africa that the natives should be impressed with the superiority of European arms and of their European masters. Indeed, his arrogance of thought and action led him to make a painful exhibition of himself and his nationality; but it may also serve as a warning to others. Europe's mission in Africa is not to enslave and misuse the natives, but to enter into co-partnership with them, for mutual profit. Dr. Peters, however, appears to think that the possession of the German flag and of a position of serfdom are as much as they are entitled to expect.

But in spite of all that has been said, there were some occasions on which Dr. Peters acted in a manner that deserved the approbation and praise of Europeans. Geographical exploration was entirely subsidiary to the main objects of the expedition, but was not altogether overlooked. In the exploration of the Upper Tana, the expedition, following for the most part in the steps of Mr. Pigott, Count Teleki and others, was successful in eliciting some useful facts.

We have nothing but praise to give the publishers for the handsome production of Dr. Peters' English edition. The illustrations are beautifully produced, by the

Meisenbach process chiefly. The translation reads smoothly, but is sorely in need of revision by a geographical expert, the translator being evidently ignorant of the geography of East Africa.

Rulers of India: The Earl of Mayo. By Sir W. W. Hunter. Oxford: Clarendon Press, 1891. Pp. 201.

This memoir is carefully condensed from the *Life and Work of the Earl of Mayo*, a work published in two volumes in 1876, by the same author, and will be much appreciated by those who have not the leisure to peruse the larger book. Lord Mayo was born in Dublin in 1822. At the age of 26, as Richard Southwell Bourke, he was returned as one of the members of Parliament for Kildare, and thus began his useful public career. In 1852, on the accession to power of the Conservatives, Lord Derby offered him—then Lord Naas—the Irish Secretaryship, much to his surprise and delight; the Conservative Government resigned shortly afterwards, but, on the return of the party to power for a short time, in 1858, he again held the same office, and for the next seven years was the parliamentary leader of the Irish Conservatives in Opposition. In 1867 Lord Naas, on the death of his father, succeeded as sixth Earl of Mayo. In 1868 Disraeli offered him the choice of Canada or India, and he wisely decided on accepting the more brilliant sphere—the Viceroyalty of India. The appointment was made before the date of the actual vacancy, and in the meantime there was a change of Ministry; a clamour arose, and the Liberal papers seriously discussed the necessity of a new appointment, Lord Mayo not being considered by them a fit and proper person for such an important office. The new Government, however, made no objection to the choice of their predecessors, and Lord Mayo took over the office of Viceroy from Lord Lawrence on 12th January 1869.

The most important work undertaken during his term of office was to bring about financial reforms. For a series of years there had been heavy deficits; in the year previous to his arrival, the expenditure exceeded the income by nearly three millions sterling; but his first year's work brought about an equilibrium, and the following three years showed a surplus of nearly six millions.

To Lord Mayo also fell the task of reconciliation after the active work of putting down the mutinies had ceased. His commanding presence, his genial manners, and his love of sport made him a general favourite; and, as he made a point of travelling through all the provinces, he made many personal friends among all classes. He founded several colleges for the education of young chiefs; orphan minors were placed under the direct supervision of selected military officers and civilians, with the result that many of the present rulers of Native States are well qualified for their position as feudatories of the Empire.

Lord Mayo's last tour of inspection was to the great convict-settlement on the Andaman Islands, in the Bay of Bengal. On completing a hard day's work on shore, and while he was passing down the quay to rejoin H.M. frigate *Glasgow*, he was fatally stabbed by a convict, and expired before he reached the ship.

The following eulogy, passed on Lord Mayo by Mr. Disraeli at the time of his appointment, came in with remarkable appropriateness after his death:—"Upon that nobleman, for his capacity, for his judgment, fine temper, and knowledge of men, Her Majesty has been pleased to confer the office of Viceroy of India. I believe he will earn a reputation that his country will honour, and that he has before him a career which will equal that of the most eminent Governor-General who has preceded him."

Wild Beasts and their Ways. By Sir Samuel W. Baker, F.R.S., F.R.G.S., etc. London: Macmillan and Co., 1891. Pp. 455.

There is probably no one more qualified to discourse on the nature and habits of wild beasts in their native haunts than Sir Samuel Baker. This veteran sportsman for nearly fifty years has hunted wild game in Europe, Asia, Africa, and America, not with the merciless butchery of the mere gunner who glories in indiscriminate slaughter, so long as it swells his game-list, but with all the instincts of a true sportsman and naturalist. As he tells us himself, he shot his game "with judgment and forbearance, upon the principles of fair-play, sparing the lives of all females, should the animals be harmless." When shooting in the Rocky Mountains, he came upon a herd of that much-persecuted animal the bison, and contented himself with killing one, although he might have shot thirty or forty with ease—which called forth the remark from his American attendant, "Well, if you come all the way from the Old Country to shoot, and you won't shoot when you 've got the chance, you 'd better go home."

In describing the habits and characters of wild animals, the author confines his remarks to those animals which have come under his personal observation, in a lifelong experience in many parts of the world. His graphic descriptions of scenery, the pleasures of the hunting-camp, the sporting adventures in plain and jungle, which go to make up this attractive volume, will be read with interest by both the hunter and naturalist. One chapter is devoted to the discussion of the best kinds of arms and ammunition, and throughout the volume the effect of the different sorts of missiles is carefully noted. The book is embellished with several capital illustrations.

Log of a Jack Tar; and Captain O'Brien's Captivity in France. Edited by Commander Lovett Cameron, R.N. "Adventure Series." London: Fisher Unwin, 1891. Pp. 379. *Price* 5*s.*

The first of these is a narrative of a sailor named Choyce, who, at the age of sixteen, with the wide world for his inheritance, started off in a whaler for the southern seas. He followed his calling for thirty years, but in reality spent half of that time as a prisoner on the west coast of South America, and latterly as a prisoner of war in France. From France he made his escape, and got on board the *Theseus* frigate, and was present in the action in the Basque Roads, when the French fleet narrowly escaped destruction. A graphic account of this action is given in Marryat's *Frank Mildmay.*

Captain O'Brien was senior midshipman of the *Hussar* frigate, which, being wrecked near Brest, surrendered to the French admiral. O'Brien, with the rest of the crew, was sent as a prisoner to Verdun. After being there for over three years, he, with several other officers, made an attempt at escape; but after reaching Boulogne they were recaptured and sent back to Verdun. Another attempt was also unsuccessful: a party including O'Brien after passing the Rhine, Strasburg, Freiburg, and Constance, were captured at Lindau, and sent back to Bitche. O'Brien, however, managed to regain his freedom on a third attempt, and, after a long and perilous tramp, was able to cross the Austrian frontier near Salzburg.

Both narratives are full of adventures and of perilous escapes, and show the abundant wiles and resources and the indomitable pluck of the British seaman.

Portugal. By H. Morse Stephens, "Story of the Nations" Series. London: T. Fisher Unwin, 1891. Pp. xxiv + 450. *Price* 5*s.*

This is a valuable and most readable addition to a useful and comprehensive series. It may at once be said that we know of no volume in the English language in

which the history of Portugal is so fully and so clearly set forth ; and for this reason alone the work ought to make a place for itself, quite apart from, and above, that occupied by most of its predecessors. Moreover, it is a painstaking and exhaustive treatise on the causes that led to the rise and fall of Portugal as a Power among the nations of Europe—dealing less with striking or romantic historical episodes than has been the case in the majority of former volumes of the series, which mostly have treated of nations whose general histories were better known to the average reader than is that of Portugal. Balance has been admirably obtained, so that full justice is done to every important event, and nothing—not even the history of the Peninsular War, upon which British writers are wont to enlarge—has too much space given to its consideration. The Portuguese colonial question, in its modern aspects, has less justice done to it than any other part of the work, and is touched with an exceedingly tender hand.

The illustrations are good, and their subjects judiciously chosen. The index is ample, and the map useful for reference.

Industrial Ireland : A German View of the Irish Question. By J. B. Keller. London : T. Fisher Unwin, 1891. Pp. 48.

As special correspondent of *Die Post*, an influential Berlin newspaper, the author of this pamphlet recently visited Ireland in order to see things there with impartial eyes. From what he saw, he considers that "Ireland is less capable than any country of great self-help, and must therefore depend upon State assistance." This German critic's remedies for Ireland are at once sweeping and onerous. He thinks Government should, 1st, expropriate all farmlands which are cultivated by tenants ; 2nd, take possession of all waste lands ; 3rd, establish an agricultural department ; 4th, open schools of practical agriculture ; 5th, establish factories for the preparation of butter and cheese ; 6th, expropriate, or at least reform, Irish railways ; and 7th, improve the waterways and export-harbours of Ireland. Pointing out that Ireland chiefly depends on agriculture, the author states that "the agricultural interest suffers most from the effects of free trade," American imports driving Irish products out of even Irish markets. With regard to the mass of the people of the remote south and west, he remarks that their mode of living "is not only not human, but is the existence of a dog, an existence such as in the poorest parts even of Wallachia or Italy would seem almost impossible."

A Lady's Letters from Central Africa : A Journey from Mandala, Shiré Highlands, to Ujiji, Lake Tanganyika, and back. By Jane F. Moir. With an Introduction by Rev. T. M. Lindsay, D.D. Glasgow : J. MacLehose and Sons, 1891. Pp. 91.

The letters of Mrs. F. Moir to members of her family were not written with any idea of publication, but they are perhaps on that very account all the more interesting in their simple, unconstrained, and vivid descriptiveness. Mrs. Moir is the first European lady to have made the journey from Mandala on the Shiré to Ujiji, and it was not accomplished without hard marching, and dangers both from storm on the Lake and a sharp attack by the fierce Attongwe. On Lake Tanganyika Mr. and Mrs. Moir visited Karema, a station of Lavigerie's "White Fathers," or French Mission. Here is Mrs. Moir's account (p. 38) :—"There are five of these men on each station, and a bishop over them, who sails about Tanganyika and visits each of the three stations in turn. The missionaries guarantee to protect the people, but not to go out and fight. So their stations are built like forts, and are very strong, and loopholed all round. A Colonel or Captain Yubert, a soldier in

the Papal army (*P.S.* an agent of the Congo Free State), has come out to do the fighting department. He is not a missionary, and lives by himself with his native troops, and his work is to defend the mission stations if they are in danger. These White Fathers are dressed in long white (when clean) flannel, white and black rosaries, and great big helmets, and are very nice men. When they are sent here they come *for life* ; they leave only when they die ! One of the Fathers at Karema has been twelve years on Tanganyika ; he looks very weak and ill, but is able for work. Their plan of operations is, to *buy* from Arabs, chiefs, parents, or relatives, several hundred small boys and girls, from three to five years old. These children live in houses round the court of the monastery or fort, and gradually grow up. Every child is taught to work, and each hoes his little bit of garden, and they are brought up strictly as Roman Catholics. I forgot to say, the Fathers plant their stations in districts where there are no villages, but lots of ground for cultivating. As these children grow, the big boys are sent to live in a village by themselves near the convent, and the big girls ditto. Then when a boy wants to marry he gets a girl, and they live together in another village further off, and are pure Roman Catholics, knowing no other religion or superstition. As each person cultivates his garden, the mission is practically self-supporting, and the only heavy expense is the buying the children year by year. The priests do not teach many of them to read, but rather encourage them in industrial occupations. . . . The weak point is the *buying* of the children, as it encourages slavery ; but, otherwise, it seems to me, they show great wisdom, and their natives turn out satisfactory."

Manica : Being a Report addressed to the Minister of the Marine and the Colonies of Portugal. By J. Paiva de Andrada, Colonel of Artillery. With a Sketch-Map by E. G. Ravenstein. London : George Philip and Son, 1891. Pp. 63. *Price* 1*s.*

The above title sufficiently describes the scope of this pamphlet. The translation is good, and has been well edited. It should be read by those who are interested in the present Anglo-Portuguese dispute. Incidentally, it contains some geographical information ; and the map, though small, is very serviceable.

Matabeleland and Mashonaland. Being a Special Number of *South Africa.* London : at the Offices of *South Africa*, 1891. Pp. 146. *Price* 2*s.*

A vast amount of general information on an interesting part of South Africa, which only recently has become known to the public, is here collected in a convenient form for reference. Many writers have been laid under contribution, in as far as the present republication of their writings is concerned. There are numerous illustrations, and a good serviceable map, showing political boundaries. Without reference to its special pleading, we can conscientiously recommend this publication as valuable to all who take an interest in the progress of South Africa.

The Bermuda Islands: A Contribution to the Physical History and Zoology of the Somers Archipelago, with an examination of the Structure of the Coral Reefs. By Angelo Heilprin, F.G.S.A., etc. etc. Published by the Author. Philadelphia, 1889.

The author, in company with a class of students from the Academy of Natural Sciences of Philadelphia, visited the Bermudas in the summer of 1888, to study the structure and physiognomy of coral reefs, supplemented with some work on the zoology of these islands. The coral reef problem is fully discussed, and the

recent literature on that subject is analysed with considerable ability. The notes on the zoology of the Bermudas are based on personal observations and collections made during the visit to the islands. Reference is made to the paucity of animal forms, characteristic of insular faunas, and also the relationship to neighbouring faunas. There are some good illustrations in the book, evidently taken from photographs.

Wanderings in South America, etc. By CHARLES WATERTON. Illustrations and Index. Pp. xxxix + 367. Thomas Nelson and Sons, 1891. *Price* 4*s.*

This is a reprint of a classical book of travel. It is nicely got up, contains a number of illustrations, and is prefaced by Sydney Smith's review, written in 1826. It should find many new readers in this form, and certainly many old ones, for Waterton's *Wanderings* is always worth going back upon.

The Malay Archipelago: The Land of the Orang-utan and the Bird of Paradise. A Narrative of Travel, with Studies of Man and Nature. By ALFRED RUSSEL WALLACE. London and New York: Macmillan and Co., 1890. Pp. xvii + 515.

A work of such world-wide fame requires no introduction to the general reader. It was first published twenty-one years ago, and the great interest it then excited has in no degree diminished, and has warranted the issue of a tenth edition. Some slight alterations have been made, and a few foot-notes added; but it remains substantially the same, which shows with what accuracy and care the first edition was compiled. It is profusely illustrated, and contains several excellent maps.

The Opening of the Arctic Sea. By H. A. N. DEMSFORD, C.E. London: Ridgway, 1890.

This is a small pamphlet of 24 pages, in which the author, with the help of a map, endeavours to demonstrate the passage of the waters of the Gulf Stream into the Pacific Ocean, and of those of the Japan Current into the Atlantic—under the Polar ice,—and the practicability of assisting this process by cutting through the ice-sheet on the north of Siberia.

The Cruise of the Dunottar Castle. By W. SCOTT DALGLEISH, M.A. Edinburgh: T. and A. Constable, 1890. Pp. 94. Illustrated.

To the guests of Sir Donald Currie, who, on the occasion of the trial-trip of the Cape and Natal royal mail steamer *Dunottar Castle*, voyaged round Scotland from the Clyde to the Forth, this sympathetic and pleasing record will be valued as a permanent memorial. But Mr. Dalgleish discourses so interestingly on the scenery and historical associations of the unrivalled Scottish coasts, that his work will appeal to a wider public, and will be appreciated by many who would gladly follow in his wake, if, perchance, such a delightful tour as that round Scotland were established by a steamship company. This beautifully printed volume derives exceptional attraction from the fact that it is adorned with a wealth of illustrations. The artists are to be complimented on their spirited sketches, which have been admirably reproduced.

"*Thorough Guide Series.*"—*Surrey and Sussex (including Tunbridge Wells).* By C. S. WARD, M.A.

"*Thorough Guide Series.*"—*Yorkshire,* Part I. (East Coast, York, etc., with Durham Cathedral and Castle). Part II. (West and part of North Riding, with Barnard Castle). By M. T. B. BADDELEY, B.A. London: Dulau and Co.

The editors of the "Thorough Guide Series" deserve well at the hands of the

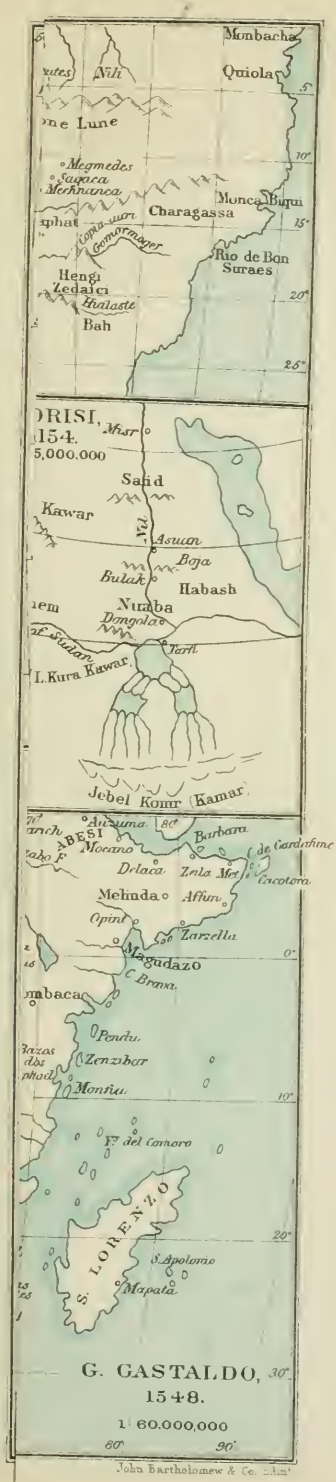
tribe of tourists who believe in thoroughly investigating their own country on foot or wheel before bending their steps abroad. Mr. Baddeley and Mr. Ward go personally over the whole of the ground they undertake to describe. Here and there this self-reliant and self-contained system is unsatisfactory and tantalising; as when Mr. Baddeley tells us that he had the bad luck to cross the North Cleveland moors from Kirkby Moorside to Danby in a dense fog, and can therefore only surmise that the scenery is "ower bad for blessing and ower guid for banning"; or when, looking towards the tempting roads that cross the Black Hambleton Hills, he candidly confesses that he has not been over them. But usually the information is of the very best; the "Guide" tells, from personal knowledge instead of hearsay, about the merits of inns and halting-places, the details of distances, the advantages or otherwise of short-cuts, the passability of routes for cycle or carriage, and a vast amount of other useful road-particulars, in addition to much well-written historical and descriptive matter. The district dealt with is mapped out on a systematic and intelligent plan. In "Surrey and Sussex" Mr. Ward, taking London as his starting-point, begins with the most easterly route to the South Coast—that terminating at Hastings—and exhausts it and the diverging branch-lines, roads, and footpaths, before taking up the next main route to the coast watering-places lying farther west. The plan of the Yorkshire volumes is to select some important tourist-centre, and from thence to explore the surrounding neighbourhood by road and rail until the whole country has been covered. The maps and plans, by Bartholomew—sixteen each in "Surrey and Sussex" and "West Yorkshire," and twelve in "East Yorkshire"—are excellent in themselves, and admirably suited for their special purpose.

The Cyclists' Route-Book of Great Britain. By W. J. Spurrier. London: Iliffe and Son, 1890. Pp. 170. *Price* 1*s.*

Handy in size, well arranged, accurate, with the information it contains fully, if tersely, conveyed, this compilation ought to prove useful to cyclists touring through England. The space devoted to Scotland and Ireland is inadequate, however; and we observe that several hills in the former country, decidedly dangerous, and some of them the scene of fatal accidents to cyclists unacquainted with the ground, are not distinguished as places where caution should be used. The volume contains a fairly satisfactory map of England in sections.

History of Newport and the Parish of Forgan; and Rambles round the District. By J. S. Neish. Dundee: W. and D. C. Thomson, 1890. Pp. vii + 256. *Price* 3*s.*

These chapters on the history of Newport appeared originally in the *Courier* and *Argus*, and must have been of considerable interest to local readers. It is doubtful, however, if they were worth reproducing in book form, as they make up a very insignificant chronicle, and scarcely appeal to any but residents in the place itself, or to those who have local interests and associations. The volume may be best described—in regard, at least, to the historical portion—as too parochial. The part of the book devoted to "rambles round the district" is a decided improvement on the earlier and bulkier portion of the work, and forms a useful guide to the various localities described; it is pleasantly written, accurate and full, without being too diffuse, in detail. The illustrations are excellent, the printing clear and bold, the whole production reflecting credit on the publishers. Had the history been of greater interest we should have missed a map and an index, with neither of which is the volume provided.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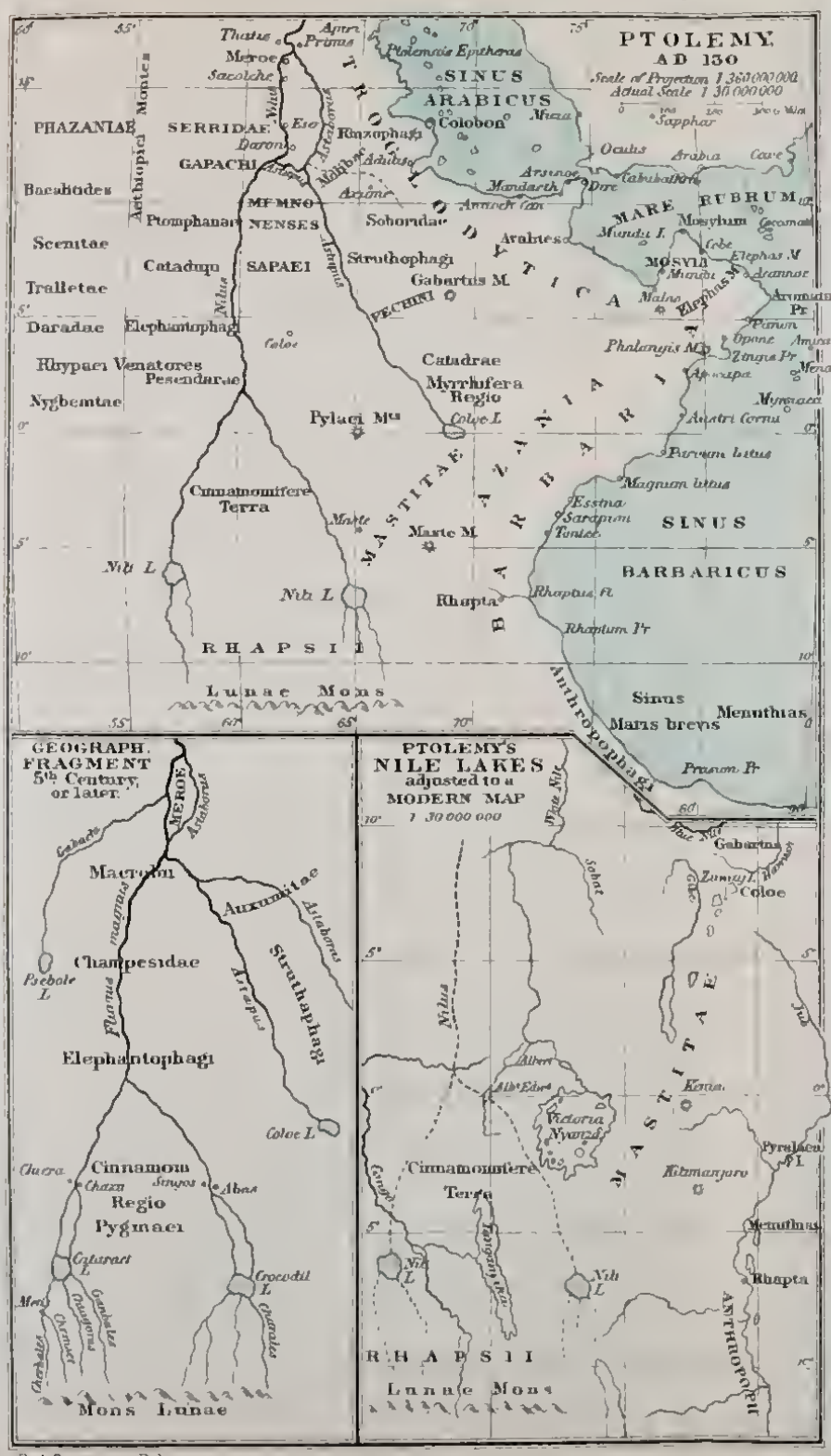
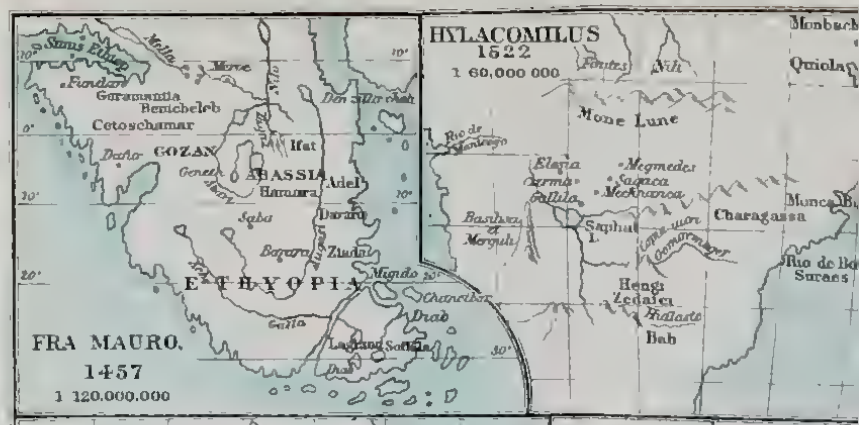
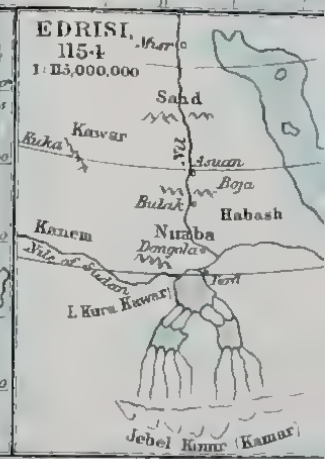
EXAMPLES OF THE PROGRESS OF AFRICAN CARTOGRAPHY.

Illustrating Mr E. G. Ravenstein's Paper







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THE SCOTTISH
GEOGRAPHICAL
MAGAZINE.

BRITANNIC CONFEDERATION.

II.—THE PHYSICAL AND POLITICAL BASIS OF NATIONAL UNITY.

By Edward A. Freeman.

I feel it a great honour to be asked to write a paper in a series to the seeming object of which I am altogether opposed. Such a request shows a willingness to listen to what is to be said on the other side which is not common in modern controversy. It is a feeling which I thoroughly return. There is no living writer whom I read more gladly and with more profit than Mr. Dicey. I am a Home-Ruler; he is an Unionist. But I know that in his writings I shall always find the case for the other side as clearly and powerfully put as it can be. And that is a great help towards being able to put the case for one's own side clearly and powerfully. There would be fewer controversies in the world than there are, and those that could not be avoided would be carried on more reasonably than they are, if only each side thoroughly understood what the other side means, and further, what is sometimes harder still, if each side thoroughly understood what it means itself.

The heading of this article is one given to me, not one of my own choice. Considering the purpose of the series, the main practical object of discussion which it suggests would seem to be whether the actual conditions of the world, and specially its geographical conditions, will allow the existence of national unity, or such measure of it as may be implied in the word 'Confederation,' between certain communities scattered over very distant parts of the world. In discussing this question, as in discussing any other question, it is needful first of all to know what it is that we are discussing. That is, we must fully make up our minds as to the meaning in which we intend to use the chief words

which we use in the discussion. In this discussion let us see, first of all, what we mean by National Unity.

I have gone very fully in another place into the question as to what constitutes a nation;[1] what I have said there I must often assume now. The word *Nation* is constantly used in very different senses, and much confusion arises from its use in different senses. In some cases it is simply used as equivalent to *independent power*. It is used thus when we speak of *international* relations, when we ask, purely for purposes of international law, of what *nationality* a man is. In answering such a question as this, the Swiss Confederation and the Austro-Hungarian Monarchy each passes for a nation. The several Spanish-speaking commonwealths of North and South America pass for distinct nations. A Greek of the kingdom of Greece and a Greek who is a subject of the Turkish Sultan pass for men of different nationalities. So do an Italian-speaking man at Trent, another at Verona, and a third at Lugano. But this use of the word *nation* and its derivatives is confined to the formal range of international politics. As soon as we get beyond that formal range, as soon as we pass from what is to what has been, to what may be, or to what ought to be, our use of the word *nation* begins to be affected by other considerations. To prove that men belong to the same nation, it is no longer quite enough to show that they are subjects or citizens of the same political power. To prove that they belong to different nations, it is no longer enough to show that they are subjects or citizens of different powers. A man's nationality becomes rather a good deal wider than the simple question to what minister or consul he must apply if he needs help in a foreign country. As soon as we begin to think of nationality in this wider sense, we feel that, besides the distinction of political powers, there is something else to be thought of which is not so easy to define. The thought of community of blood, of community of language, of fellowship in the events of past times, all come in. And yet we presently begin to feel that we cannot build up a theory of "National Unity" on any one of these things by itself. So to do would soon lead us as far astray as we should be led by the formal doctrine of international law. We gradually come to see that there is such a thing as an idea of a nation in the mind, but that such an idea hardly ever answers to anything that has any actual being on earth. Does it at all follow that the idea of a nation that we have in the mind is a mere dream, unpractical folly, and the like? A mere dream it certainly is in one sense; unpractical folly it certainly is not. The ideal notion of a nation is like any other counsel of perfection. Such a counsel is a model to which every man cannot attain, to which very likely no man can attain, but which every man is the better for keeping before him and getting as near to it as he can. It may therefore be worth while to try to give an ideal definition of a nation, even though it may be very hard, perhaps quite impossible, to find any existing nation which answers to it.

[1] I refer, as I often have to do, to the Essay on "Race and Language," which first appeared in the *Contemporary Review* for March 1877, and which is reprinted in my *Third Series of Historical Essays*, p. 173.

The ideal nation then, I would say, is to be found where a continuous territory is inhabited by a people united under one government, and all of them speaking the same language, a language which is not spoken by any other people.

It will be noticed that I am satisfied with unity of language, and that I say nothing about unity of race. The question of race is too deep for our present inquiry. It doubtless is a practical question. That is, there is every reason to think that strict community of blood,[1] where it exists, has a real influence. But that influence works in such silent and uncertain ways that we cannot reckon on it as an element in our calculations. We must take the outward sign of language instead of it. Community of language is doubtless often a witness to real community of blood; it is very often only its substitute. We know that it is so in many cases; we suspect that it may be so in many others. But in practical matters it is the only test that we can go by. And we must take the word *language* in its rough practical sense. It does not shut out wide differences of dialect. It is enough if the speakers of each dialect understand the speakers of every other. Indeed I should rather say that it was enough if there is one central dialect which is understood by the speakers of all the others. In the sense with which we are concerned, all Great Britain and Ireland speaks English, except so much as speaks Welsh, Gaelic, or Irish. French and Provençal are historically as truly distinct languages as French and Italian; but, for our purposes, all France speaks French, except so much as speaks Basque, Breton, or Flemish.

Now, taking this definition of an ideal nation, it might be rash to say that there is nothing answering to it in any part of the world. But it is quite certain that there is nothing exactly answering to it among the civilized states of Europe and America. It is equally certain that some of those states come much nearer to the model than others. Among those which rank as "Great Powers" the kingdom of Italy may from one side be said to reach it. The dialects of Italian are many and strongly marked; but, as language has been defined above, we may fairly say that the whole kingdom speaks Italian.[2] And on the other side, though there is an *Italia Irredenta*, it is small compared with the large districts out of the German Empire which speak German. France, as far as Europe is concerned, comes on one side nearer to the model than Italy. There is a lost territory which France wishes to win back, but it can hardly be called a *Francia Irredenta*. Germany is further off from the model on both sides; Russia is on one side nearer to it than Italy, for

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[1] When I speak of "community of blood," I do so under the limitations drawn in the article above quoted. It is always possible that, even where there is community of *race* in the strictest sense of the word *race* to which we can reach, there may be no physical community of blood.

[2] I do not forget that within the kingdom of Italy there is a district that speaks French (or Provençal), another that speaks German, and another that speaks Slave. But they are districts which are almost invisible, and which may be said to come under the rule, "*De minimis non curat lex.*" The non-French-speaking parts of France are much greater, and the non-English-speaking parts of the United Kingdom much greater again.

there are few speakers of Russian out of the Russian empire;[1] on the other side it is much further off than Germany, as the Russian empire contains millions on millions who are not speakers of Russian. Still Russia and Germany are both national powers; if they contain non-Russian and non-German elements, it is the Russian and German kernel round which they are gathered which determines everything. The Austro-Hungarian monarchy stands among the six Great Powers at the other end. As a whole, it has no national life or national tie whatever. Yet one of its chief members, the kingdom of Hungary, has both in a large measure. Among the smaller powers of Europe the same differences may be seen, though most of them come much nearer to national unity than the great ones. Switzerland stands out among them all, a power made up by the union of fragments of other powers, speaking four languages within its borders,[2] and yet possessed of a true national life. Its example shows that, as language habitually takes the place of race in the formation of nations, so, under special circumstances, political necessities can take the place of language.

Of the six Great Powers, as they usually are called, I have mentioned five. One remains, that with which we are ourselves most nearly concerned. The power of Great Britain has a very different air, according as we look at it simply as an European power or as a power spreading into all parts of the world. In the former character it comes on one side nearer to the definition of the model nation than any of the other Great Powers. If English is by no means the exclusive language of the United Kingdom, yet the United Kingdom takes in all that part of Europe where English is a natural language; the United Kingdom and its dependencies take in all that part of Europe where English is spoken at all.[3] And I have kept back till now one point of the original definition, namely, that the territory of the ideal nation should be *continuous*. Of course this definition is not meant to cut out every case where a territory may consist either of a group of islands or of a piece of mainland with islands lying near to it. Greece and Denmark are obvious instances. Italy might cause a moment's thought; Capri, Elba, Sicily, and Sardinia, might seem to stand in four different relations to the peninsular kingdom; but we need not stop to examine the point, which just now is not a practical one. About France, Germany, Russia, there is not much to say in the way of islands. That Jersey, Guernsey, and their fellows, have been for ages dependencies of

[1] Only the Ruthenians, the Russians of Red Russia, in the kingdom of Galicia and Lodomeria, one of the possessions of the House of Austria.

[2] German, French, and Italian are acknowledged by the Confederation as national languages. The fourth speech, the Romansch of Graubünden, is not. This is most likely because the other three, as the languages of Great Powers outside the Confederation, proclaim themselves as independent languages, while Romansch has the look of a mere dialect. But it is the independent speech of part of Switzerland, and it is not a dialect of any of the other three.

[3] I have to make this distinction, because Man and the Channel Islands are not part of the United Kingdom, but dependencies of it. And in them, though English has made a certain progress, it is not the natural language. In more distant dependencies, as Malta, however many people may find it convenient to learn English, it is strictly a foreign language.

England, and have not been incorporated with France, shows how geography may sometimes have to yield to manifest interest and to a historic tie. With this exception, the islands attached to each of those powers follow naturally on the possession of the neighbouring coast. If any one grudges the possession of Åland by Russia, the other chance is that it should go back to Sweden. The British possessions in Europe stand on quite another footing. The United Kingdom consists of two large islands and a number of smaller ones. In the middle of them lies the dependency of Man, at some distance the dependent Channel Islands; at one end lie Orkney and Shetland, of which I am not called on to speak particularly. But islands like Wight, Anglesey, Bute, may be reasonably called continuous with the Isle of Britain itself. The only question lies between the two great islands, Britain and Ireland. Some have thought that their geographical position—specially with a distinct, though dependent, state lying between them—points to a state of things in which they should have a certain connexion with one another, but a connexion less close than that which binds the several parts of Britain to one another. On this thorny question I will not enter here. All that concerns us just now is that the United Kingdom, as it stands at present, is the one purely insular power among all the powers of Europe, great and small. The home territory is insular; so are all the European dependencies, except one peninsular rock. And the home territory, at first sight at least, hangs well together. If we cannot always walk from one part to another, it is practically as continuous as many continental territories. No foreign territory comes between any part of it and any other part; and it has one great advantage over all continental territories, namely, that it has no frontier towards any foreign country.

Having thus got some notion of the conditions of national unity as they exist in Europe, we go on to the further question, what those conditions are, and whether there are any such conditions in the case of lands which are in quite another case from the lands of Europe. Is national unity, in any sense at all approaching to our definition of it, or indeed in any sense, possible in the case of territories which do not lie continuous in Europe or in any other part of the world, but which are scattered over all the regions of the earth, over distant continents and islands, parted from one another by vast stretches of Ocean? How does the case stand when, to go from one part to another, large foreign territories have, sometimes to be crossed, constantly either to be crossed or gone round? That a scattered dominion like this can be held together by allegiance to a common sovereign or to a common ruling city is shown by many examples in various ages. Such was the dominion of Carthage, Athens, Venice, and Genoa, in the Mediterranean, in days when the Mediterranean was what the Ocean is now.[1] Such has been the dominion of Portugal, Spain, France, Holland, England, since the Ocean has become what the Mediterranean

[1] The unbroken dominion of Rome does not come in here. Though, or rather because, it took in the dominion of all the cities mentioned in the text, it was not scattered but continuous. But in after times the Roman power at Constantinople did become a scattered dominion, like that of Carthage and Venice.

once was. And experience also proves that the central power may either hold a despotic rule over its distant dependencies, or may grant them the highest measure of internal freedom consistent with their remaining dependencies. But here the line is drawn. At this moment most of the colonies of Britain enjoy, in all ordinary times, each one within its own bounds, very nearly as full an amount of freedom as if it were an independent state. But in any wider relations it has no voice. It can have no dealings with foreign powers; those it must leave to the central power which acts on its behalf, as on behalf of all the other possessions of the common sovereign. Nay, it cannot of itself enter into closer relations with its immediate neighbours. The so-called Confederation of Canada did not, like the Confederation of the United States, come into being by the act of its own members. It exists by virtue of an Act of the Parliament of the United Kingdom. That Act doubtless expressed the wishes of the lands concerned; but those lands might have wished for ever if the British Parliament had not put their wishes into a practical shape. That is to say, all these lands, whether remaining as separate colonies or united into the shape of a Confederation, are simply dependencies of the United Kingdom, enjoying such privileges as the Parliament of the United Kingdom may think good to grant to them. That supreme power can at any moment override even internal independence; it can legislate at pleasure for the dependency even against its will. Till quite lately we used to say that, though such a power existed in theory, it was not likely to be carried out in practice. But sleeping lions sometimes wake, and we have just seen the supreme authority of the British Parliament over a British dependency carried out in its fulness.

Now suppose the people of the dependencies—those dependencies, I mean, which are practically independent within their own range—become dissatisfied with their dependent state, and wish, to put the case plainly, to be put on a level with the people of the United Kingdom. That is, suppose they wish, not only to manage their own internal affairs, but to have a voice, in some shape or other, in all affairs that may concern them. It is obvious that there is one way in which this may be had. It may be won in the same way in which its was won by the Thirteen Colonies which became independent in 1776. That is, the act might take the same shape, though the course which led to it might be quite different. That is to say, the mother-country and the colony might part asunder, not through war, like the Thirteen Colonies and the colonies of Spain, but peacefully, as Portugal and Brazil parted asunder. And if any colony now enjoying internal freedom chose to put forth a Declaration of Independence, it is not likely that the mother-country would constrain it by force to remain in a state of dependence. But, supposing the dependency wishes that its state of dependence on the mother-country should cease, but that it does not at all wish that its political connexion with the mother-country should cease with it. Its people, we may put it, wish to be put on a level with the people of the mother-country, but they do not wish to be put on a level with them by becoming a people wholly apart from the mother-country. They wish to be put on a level with them by being promoted to a voice in certain matters in which the people of the

mother-country now have a voice, but in which they have none. But they wish to have a voice in those matters in common with the people of the mother-country, not apart from them.

Now this is as much as to say that they wish for a federal union with the mother-country and with one another. There is another form of union, possible in theory, but which is really not worth discussing in practice. I mean that the colonies might be joined to the United Kingdom in the same way in which Scotland was joined to England and Ireland to Great Britain. Members for the colonies might be admitted to seats in the Parliament of the United Kingdom. But to carry this plan out consistently would involve the abolition of the separate legislatures of each colony. One Parliament would legislate for all. By this means the national unity which at present exists between the mother-country and the colonies would, on its political side, be drawn much closer. All parts of the scattered territory would be politically equal; no part would be dependent on any other part; everything that could be called "national" in any sense would be common to all parts on equal terms. Yet I cannot believe that any dependency would be willing to purchase closer national unity on such terms as these. Surely every British colony would refuse to exchange its abiding independent management of its own affairs for a voice in affairs which would concern it only now and then. It had surely better remain dependent than share in an independence which has to be purchased at such a cost. What therefore is really sought for by those who wish for some closer and higher form of national unity than a relation of dependence is not absorption into the United Kingdom, but some kind of federal union with it. Three questions here arise:—What are the lands which are to enter into a federal union? Is it possible to establish any kind of federal union among such distant and scattered members? If such an union can be established, will it practically lead to any closer form of national unity?

These questions seem to bring us to the edge of the dark abyss of what is called "Imperial Federation." But I am glad to see that in the present discussion a good deal has been done to make it possible to argue matters more reasonably than can be done when "Imperial Federation" has to be debated. On the principle that language was given man to conceal his thoughts, "Imperial Federation" is surely the wisest name ever thought of. On any other principle it is surely the most foolish. For it is absolutely without meaning; it is a contradiction in terms. "Empire" implies the rule of some person or power over some other; "federal" implies the union of certain powers or communities, presumably on equal terms. What is imperial cannot be federal, and what is federal cannot be imperial.[1] The power which the

[1] The only case in which the words "Imperial Federation" could have any meaning would be if they were applied to the German Empire. That Empire is federal in form, and its chief bears the title of Emperor. So far it is an imperial federation. As for the title of its chief, I have often had to remark that the head of a confederation which has kings among its members can hardly be called anything but Emperor. But the position of the Emperor and of the State of which he is the head quite cuts off the German Empire from being reckoned as a real federation. If anything, it is rather a federal empire, an empire in the shape of a federation.

Sovereign and Parliament of the United Kingdom exercises over the colonies and other dependencies of the United Kingdom may, if any one chooses, be called an "imperial" power, though the use of the word leads the way to many confusions. But if the power of the mother-country over the dependencies is exchanged for a federal union with them, "empire" passes away, and the word "imperial" is out of place. The "empire," if that is to be the word, may be changed into a confederation; the "imperial" relation of Great Britain towards Australia or Canada may be changed into a federal relation. But a thing cannot be at once "imperial" and federal; "empire" shuts out confederation, and confederation shuts out "empire." But granted that there is to be a federation of something, what are the members which are to enter into the federal relation to one another? When I have asked this question, I have sometimes been told that Imperial Federation means a confederation of all the Queen's dominions; sometimes that it means a confederation of all "the English-speaking people." Each of these answers has a meaning; but they have two very different meanings. Which are we to choose? The English-speaking people and the Queen's dominions are very far from being the same thing. The majority of the Queen's subjects are not English-speaking, and I fancy that the majority of the English-speaking people are not the Queen's subjects.[1] A confederation of the Queen's dominions, especially if it be called "imperial," cannot shut out the "Empire" of India; and if that be let in, the European, white, Christian —however we choose to distinguish them—part of Her Majesty's subjects will be a small minority in the confederation. Great Britain, Canada, Australia, will always be out-voted by the greater mass of their Asiatic, dark-skinned, Hindoo, Parsee, and Mahometan fellow-subjects. And the place of meeting for such a confederation cannot be Westminster or Ottawa or Melbourne; it must be Delhi, or anywhere that the Asiatic majority may think good. Is this what anybody in Great Britain, or in any English-speaking colony, wishes for? I trow not. But "Imperial Federation," defined as a federation of the Queen's dominions, either means this or it means nothing.

If, on the other hand, Imperial Federation is defined to mean, as I have seen it defined to mean, a federation of "the English-speaking people," then it must leave out the greater part of the Queen's dominions, and it must take in a great deal that lies outside the Queen's dominions. It must leave out India; it must take in the United States. And here comes the very pertinent question whether the United States would be inclined either to enter into any confederation of ours or to let us into their already existing confederation. One thing is quite certain; the United

[1] It is as well not to be positive, and I am writing without figures. But I should fancy that the population of the United States, even if we take off something for European immigrants who have not yet learned English, is greater than that of the United Kingdom and its English-speaking dependencies. We need not take off anything for the negroes; they are certainly not English, but they are English-speaking; and it is to be supposed that those who asked for a confederation of the English-speaking people meant to include them. In any case, the population of the United States, if not a majority, must be a minority so great as for our purpose to be the same.

States will have nothing to say to any "Imperial Federation": that is —to try to get a meaning out of a formula which is meaningless—to any federation in which some member, like Thebes or Prussia, exercises a supremacy over the others which may, if any one chooses, be called "imperial."

These are the only two attempts at defining "Imperial Federation" which I have ever seen. Commonly, when a man talks about "Imperial Federation," he means something else, something very ill-defined, something which, if one better got to understand it, might prove to be wise or foolish, possible or impossible, but which is in no case federation, Sometimes it is something about the post-office, sometimes something about customs and tariffs. These things are all very important; but they are not federation. A *Postverein*, a *Zollverein*—I must be allowed to use the native language of political science—is not a *Bundesstaat*. Even in English the word *Federation* has a meaning. It means that several distinct political communities agree to become one political community for certain purposes, and to remain distinct political communities for certain other purposes. They agree that each community shall settle its internal affairs for itself, but that common affairs shall be settled by a common power in which all the members are represented. What are to be looked on as internal and what as common affairs must be settled by agreement in each case. The federal ideal is satisfied if there are some things which each State does for itself and some others which the Union does for all. That the Union only should be able to act in international affairs seems essential.[1] If a man talks about "Imperial Federation," he should tell us whether this is the relation that he proposes to establish, and between what constituent members he proposes to establish it.

Now the paper by Sir John Colomb, headed a "Survey of Existing Conditions," is in many ways a relief to one who has been greatly puzzled by vague talk. Sir John Colomb asks, "What is the empire of Her Britannic Majesty?" To this question the obvious answer is, "The Empire of India, and nothing else"; for nowhere else has the word "empire" any legal meaning. Sir John Colomb talks a good deal about "empire," but very little about "imperial," and nothing at all about "Imperial Federation." The name in short is dropped, and we get "Britannic Confederation" instead. This certainly makes things a little clearer. There is one gain at least if "Britannic" is put instead of "Imperial." "Britannic" does suggest "National Unity" in some shape or other. "Imperial" shuts out national unity; there is no national unity where one State exercises lordship or "empire" over another. Still, the name "Britannic" has an odd sound. It is unknown except in the formula "Her Britannic Majesty," meaning the Queen of Great Britain and Ireland. The word "Britannic" is used only in this formal diplomatic style. For we talk of "British Government," "British dominions," "British interests," "British consulate," even "British Ambassador" and "British legation." We never, in English at least, say "Britannic Government" or "Britannic

[1] It is essential to the *Bundesstaat*; it does not seem to be essential to the *Staatenbund*.

legation." But the use of the word "Britannic" at all events settles at once all difficulties about the "English-speaking people." The word "English" takes in the United States, or it ought to do so. The word "Britannic" assuredly does not, any more than the word "British." And it would be hard to believe that a "Britannic Confederation" could be meant to take in that large majority of Her Majesty's subjects who have nothing to do with federation or with freedom in any shape, but who inhabit Her Majesty's imperial dominion in Asia. We are relieved from all those "imperial" dangers at page 234 of Sir John Colomb's paper. While "Imperial Federation" has never been intelligibly defined, one side of "Britannic Confederation" is very intelligibly defined there. The Empire of India is distinctly shut out. It is not to be in any way federalized; the only question about it is whether it shall be "governed by the United Kingdom or by an united empire." An empire to be governed by another empire, an empire seemingly not united to be governed by another empire which is united, is a little puzzling. But we need not exercise ourselves in such great matters as empires. "Britannic Confederation" is defined to be an union of "the United Kingdom of Great Britain and Ireland, British North America, British South Africa, and Australasia." The West Indies and one or two other British dependencies seem here to be shut out; but at any rate, with this definition, we at least know where we are.

The terms of the union we are not told; but as the word "confederation" is used, I conceive that they are meant to be strictly federal. That is to say, first of all, the Parliament of the United Kingdom will give up its right to legislate for British North America, British South Africa, and Australasia. Then the United Kingdom, British North America, British South Africa, and Australasia, will enter into a federal relation with one another. They may enter either as single members (States or Cantons) or as groups of members. That is, Great Britain and Ireland might enter as a single State of the Confederation, or England, Scotland, Ireland, Wales—or possibly smaller divisions again—might enter as separate States. Or Great Britain, Australia, Canada, etc., might enter as themselves Leagues, members of a greater League, as in the old state of things in Graubünden. I am not arguing for or against any of these arrangements. I am only stating them as possible. But whatever the units are to be—Great Britain and Australia, England and Victoria, or anything larger or smaller—if the Confederation is to be a real one, each State must keep some powers to itself, and must yield some powers to a central body. That central body, in which all the States must be represented in some way or other, will naturally deal with all international matters, all matters that concern the Britannic Confederation as a whole. The legislatures of Great Britain and Australia, England and Victoria, or whatever the units fixed on may be, will deal only with the internal affairs of those several cantons.

Now such a scheme as this is theoretically possible. That is, it involves no contradiction in terms, as the talk about Imperial Federation does. It is purely federal; there is nothing "imperial" about it. It is simply applying to certain political communities a process which has been

actually gone through by certain other political communities. It is proposing to reconstruct a certain political constitution after the model of certain other political constitutions which are in actual working. It is therefore something better than mere talk and theory. But because it is theoretically possible, it does not follow that it is practically possible, that is, that it is possible in this particular case. That a certain system exists, that it has succeeded, in certain cases, proves only that it *may* succeed in another case; it does not prove that it *will* succeed. It proves that there is no obvious absurdity in suggesting it, that the suggestion is fairly entitled to be weighed, and, if need be, answered; but it proves nothing more. In each case we must look to the probabilities of the particular case, both political and physical. For this is assuredly a case in which geography has something to say. It is one in which it seems to depend wholly on geographical considerations whether the scheme is likely to succeed or not. If Canada or Australia joined Great Britain, or lay close to Great Britain, the only question would be between absorption and federation. Lying as they do at a great distance, we have ruled that national unity would not be promoted by their absorption into the United Kingdom; we have now to consider whether it is likely to be promoted by their federation.

Of the federations existing at this time the two chief are Switzerland and the United States of America. They differ in this point, that one is very large and the other very small; they agree in this, that the territory of both is continuous. But the proposed Britannic Confederation will be scattered, scattered over every part of the world. I know of no example in any age of a scattered confederation, a scattered *Bundesstaat*. The Hanse Towns were not a *Bundesstaat*; they were hardly a *Staatenbund*. Of the probable working of such a body as that which is now proposed the experience of history can teach us nothing; we can only guess what may be likely. The Britannic Confederation will have its federal congress sitting somewhere, perhaps at Westminster, perhaps at Melbourne, perhaps at some Washington called specially into being at some point more central than either. We are sometimes told that modern science has annihilated time and space; and for some purposes it is so. I have been told that it takes no longer to get to Westminster from the most distant British colonies than, at the time of the union of England and Scotland, it took to come from Shetland to Westminster. May I be allowed to leave out Shetland, which has a case of its own, and to draw the line at Caithness, or to substitute one of the Western Islands for Shetland? Certainly in the days of Queen Anne both those islands and the mainland of Caithness were a very long way from Westminster, perhaps as far, by the almanack, as any colony is now. Still from Caithness a man could walk to Westminster; even from the Islands he could get there without crossing or going near any foreign territory. Between Caithness and Westminster there was doubtless on both sides a good deal of traditional ignorance and traditional dislike; but it was the kind of ignorance and dislike which might in time die out, and which largely has died out. It was a wholly different feeling from the feeling of a young dependency which wishes to love the mother-country as long as

it is allowed, but which daily feels more and more sharply any sign of inferiority to the mother-country. For a while their representatives will think it grand to sit at Westminster; presently, as the spirit of equality grows, they are not unlikely to ask for some more central place; they may even refuse to stir out of their own territory. That is to say, they will find that the sentiment of national unity, which they undoubtedly have in no small measure, needs some physical and some political basis to stand on. It is hard to believe that States which are united only by a sentiment, which have so much, both political and physical, to keep them asunder, will be kept together for ever by a sentiment only. And we must further remember that that sentiment is a sentiment for the mother-country, and not for one another. Sir John Macdonald said that he was born a British subject and that he would die one. His heart would hardly have been so stirred by any sentiment of federal brotherhood towards Australia or South Africa. Canada and Australia care a great deal for Great Britain; we may doubt whether, apart from Great Britain, Canada and Australia care very much for one another. There may be American States which care yet less for one another; but in their case mere continuity produces a crowd of interests and relations common to all. We may doubt whether the confederation of States so distant as the existing colonies of Great Britain, whether the bringing them into closer relations with one another as well as with Great Britain, will at all tend to the advance of a common national unity among them. We may doubt whether it will not be likely to bring out some hidden tendencies to disunion among them.

The ground—a just and natural ground—which makes a colony wish to get rid of the dependent relation is that it does not like to be ordered about in any matter by the Colonial Office at home. It does not like the chance of being drawn by the mother-country into some relation, perhaps some war, in which it has no interest. It may be doubted whether a federal relation will practically make matters better in this respect. In form of course it will do so; each colony will be represented in the federal body, which will see to all matters of common interest. But let us look at it in another way There is every chance that the federal power, executive and legislative, will meddle a great deal more with local affairs than the Colonial Office does now. It will do so for the very reason that each colony will be represented in it. It will not, like the Colonial Office, be shy of meddling. The Colonial Office, after all, steps in only now and then, in this and that special case. But if a regular Britannic Confederation be set up, it will be like other confederations. Its Executive branch must be always at work; its Legislative branch must be at work for the same kind of time that other Parliaments and Congresses are at work. It will be inclined to meddle; it will be pressed to meddle; it will be its duty to meddle. It must, in the nature of things, exercise a far greater control over each State than the Colonial Office now does. And though each State will have a voice in it, each State will always be liable to be out-voted on the matters which are dearest to its heart. The interests and feelings of a number of distant and isolated States, none of which will have any particular reason for

dealing tenderly with one another, are likely to clash with one another much oftener and much more roughly than happens between particular colonies and a mother-country which has every reason to deal tenderly with all. All these tendencies are present in all confederations; they are the weak side of confederations. But they are likely to come out far more strongly in a confederation of scattered and distant members than they do when the States form a continuous territory. And in the scattered confederation all questions and parties are likely to be local. It is hard to see what will be the materials for the formation of great national parties among such scattered elements.

And one thing more must be said from the side of the mother-country itself. Does every one who talks about federation, "Imperial," "Britannic," or any other, always think what any kind of federation means as regards the Parliament of Great Britain? We are used to boast that that Parliament knows no superior on earth, that its powers are limited only by the physical powers of nature. Make Great Britain a member, make England and Scotland separate members, of a Britannic Confederation, and all this greatness passes away. The powers of the British, English, Scottish, Parliament will at once cease to be boundless; they will be cut down to the measure of such powers as the Federal Constitution may leave to each of the several States. The British, English, Scottish, Parliament will sink to the level of the Legislature of Delaware or the Grand Council of Zug. Are we ready for this? I can speak for one man only. I am no lover of "empire"; I am not anxious for my country to exercise lordship over other lands, English-speaking or otherwise. But I will not, as far as one man can hinder it, have my country ruled over by any other power, even by a power in which my country itself has a voice. If it is proposed that the great and historic assembly which King Edward called into being in 1295 shall keep its six hundredth anniversary by sinking to the level of the Legislature of a Canton of a Britannic Confederation, then I shall be driven, however much against the grain, to turn Jingo and sing "Rule Britannia."

MAPPING AND PLACE-NAMES OF INDIA.

By Jas. Burgess, LL.D., C.I.E., etc.

I.—*Mapping.*

In the seventeenth-century maps of India one is struck by the remarkable displacement of everything away from the coast. By the year 1600, the coast-line, in the chart which Shakespeare[1] called "The New Map with the augmentation of the Indies," had assumed a fair resemblance to the true outline; and in it the ports had been filled in with evident care from the charts of the Portuguese and of Lindschoten. The list of names is interesting, and may be here transcribed:—Taenadir (near

[1] *Twelfth Night*, Act iii. sc. 2. "Twelfth Night" was first acted at the Middle Temple in February 1601. This map was the first chart of the world on Wright's (or Mercator's) projection printed in England. It was reprinted by the Hakluyt Society in 1880.

Sonmiyani), R. Guzurate (the *Khadar* or *Ghasrâ*, mouth of the Indus), Derment, Diui (for Diul or *Deval*, an early seaport on the Khadar mouth), Indu R., Cambaya, Gandiua (*Gandevî*), Chaul,[1] Babul (*Dabul*), Bander,[2] Goa, Mangalor, Cananor, Calicut, Cochiu, C. Comori, Cael (*Kayal*), Columbo, Zeilau, Malabar, Voligamale (?), Penacota, Calmagam, Chundsiori (or Chundsion ?), Cunura (? *Konada*), Puripagam (*Puri* pagoda), C. Sodagora (*C. Palmyras*), Asedegam, Aralem, Categam (*Satgaon*), Ogouro, Ganges R., Bicanapor,[3] and Bengala (*Chitagong*).

The interior of India was represented, even so late as 1725, in the most confused way: the Ganges, for example, was drawn as rising near Taskent, which was placed in about 48° N. latitude and 92° E. longitude, from which it was made to shape its course nearly due south; the Indus was made to run direct for the Gulf of Cambay, and at Ahmadabad suddenly to branch eastwards partly into the Gulf of Kachh; and the cities were scattered about apparently at haphazard: Dehli was placed in the same latitude as Surat, and Agra 560 miles north of it, in about 28° North.

From 1601 the captains of the East India Company made careful observations of the coasts, and their logs were rich mines of information, but "all log-books dating farther back than 1855 have been burnt at Calcutta, and, in 1860, tons of precious records in the India Office shared the fate of the Alexandrian Library."[4] In the interior, too, information was steadily collected by travellers of different nationalities, and all the available knowledge of India was collated and utilised by the great French geographer, J. B. B. D'Anville, whose map of India was published in 1752, and an English edition with a memoir by Herbert appeared in 1754. It was a great advance on all that had preceded it, but still far from accurate in many details. James Rennell (1742-1830), a captain of artillery, who served in Clive's army, was appointed Surveyor-General of Bengal about 1763, and at once began a systematic survey of Northern India. His maps of Bengal and Bihar were published as the *Bengal Atlas* in 1784. In 1782 he returned to England, and early in 1788 his famous map of India appeared, followed in 1792 by the *Memoir* giving a full account of the materials on which the map was based.

Colonels Call, Kelly, Wood, Ch. Reynolds, and others made numerous route-surveys, while Col. Pearse, Lieut. Colebrooke, Mr. R. Burrows, and Dr. Hunter took astronomical observations for the latitude and longitude of important points, and so contributed much to the correction of Rennell's map. Call and Reynolds also prepared important new maps, but they were never published.

The Trigonometrical Survey of India was originated by William Lambton (1763-1823), an infantry officer in the army of General Harris

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[1] The editor of the 1880 reprint has read this *C. Baul*: it is clearly *Chaul*, then well known to the Portuguese.

[2] I read Banda. Possibly the two words may stand for Dabul Bandar—the harbour of Dabul.

[3] The editor of the 1880 edition omitted *Aralem* from the list, and failed to decipher the first syllable of *Bicanapor*, while he read the *m* of *Categam* as *ni*.

[4] Markham's *Memoir on Indian Surveys*, 1878, p. 3.

in the war with Tipu. He had joined the 33rd Regiment in 1797, then commanded by Sir Arthur Wellesley at Calcutta, and was brigade-major during the Maisur campaign. After the fall of Seringapatam, Lord Mornington took measures for exploring the newly acquired territory; Dr F. Buchanan [1] reported on the agriculture and products; Col. Colin Mackenzie made excellent topographical surveys; and Lambton submitted his project for the measurement of a meridional arc and for a trigonometrical survey across the peninsula to form a basis for all future topographical and revenue surveys. When it was laid before the Government of Madras, a certain member of the Finance Committee, on being informed, as a reason for the survey, that many important places were wrongly laid down in the existing maps, objected to the expenditure, because, he said, "If I wish to proceed to Seringapatam, I have only to tell the palanquin bearers, and they will find their way to it just as well as if it were ever so accurately placed on the maps."

Lambton's proposal, however, was supported by his colonel, afterwards the Iron Duke, both with his brother, Lord Mornington, at Calcutta, and with Lord Clive at Madras, and finally approved. But it was not till 1802 that he was furnished with instruments—a 3-feet theodolite by Cary, a 5-feet radius zenith sector by Ramsden, and a 100-feet steel chain which had been sent with Lord Macartney's embassy as part of a present of astronomical and other instruments to the Emperor of China. It was, however, refused by the old Emperor, as 'of no value or use.' It was handed over to Dr. Dinwiddie of Duncow, the astronomer to the mission, apparently as part payment for his services, and brought by him to Calcutta, in 1794, in the *Jackal*, with a cargo of tea, tallow, and varnish plants under his charge. There he was appointed lecturer in Natural Philosophy in the College of Fort William. Lord Mornington bought the chain and zenith sector from Dr. Dinwiddie, and sent them to Madras. Assisted by Lieutenants Kater and Warren, Lambton began the measurement of base-lines, commencing with one of $7\frac{1}{2}$ miles long near Madras. From this a triangulation was carried across to Bengalûr, where a second base was measured in 1804. Triangulation to the coast at Tellichery (Talasseri) and Mount d'Éli, showed that the breadth of the peninsula at this point was only 300 miles, whereas the maps had hitherto represented it at 400.

Other bases were measured, and triangulation was pushed forward until, in 1815, on completing a base at Dumargida near Bidar, he had accomplished the measurement of a great meridional arc of nearly 10 degrees in length, from Panne, 8 miles NE. of Cape Kumârî. Yet the value of Major Lambton's survey was depreciated at home, his resources were crippled and starved by the Madras Finance Committee, and he received not a word of encouragement, sympathy, or advice, either from Government or the home scientific societies. In 1817, however, the French Institute made him a Corresponding Member: then the Governor-General, at last, recognised the great importance of the survey and gave

[1] Born at Branziet in Stirlingshire, 15th Feb. 1763; he afterwards took the surname of Hamilton; and died at Leny, near Callander in Perthshire, 1829.

it his support, and the Royal Society elected him a Fellow. But he was now an old man, and died on the road at Hinganghât, on his way to make arrangements for continuing the Great Arc. He had completed the triangulation of 165,342 square miles. He was succeeded by Captain (afterwards Sir) George Everest, who continued as Surveyor-General till 1843, during which period he revolutionised and improved the whole system of the surveys, and vastly extended their area. He carried the triangulation for the Great Arc to Banog in the Himalayas, the triangulation covering an area of 56,997 square miles.

Topographical surveys, begun in the south by Colonel Colin Mackenzie in 1783, were carried on in different provinces, and, after about 1812, they were based on Lambton's triangulation so far as available. As the Great Trigonometrical Survey advanced, this became practicable in every district, and between 1822 and 1842 the topographical surveys had made great progress. Indeed, from 1830 till 1861, the offices of Surveyor-General or head of the Topographical Surveys and Superintendent of the Great Trigonometrical Survey were united in one person. The network of the Trigonometrical Survey is now all but complete, and a great atlas of sheets representing nearly the whole of India is mapped to a scale of four miles to an inch, with many districts also to larger scales.

The map of India which succeeded Rennell's was that of Aaron Arrowsmith, in nine sheets, to a scale of 16 miles to an inch, or 1: 1,013,760, published in 1816. But the work of the new topographical surveys, based on Lambton's triangulation, now began to attract attention, and, materials being put into Arrowsmith's hands, he projected a new map of India on a scale of 4 miles to an inch, or 1: 253,440, and published an atlas (18 sheets) of South India in 1822. On Arrowsmith's death, Mr. John Walker (1787-1873) took up his work, and prepared a map, in four sheets, published by Kingsbury, Parbury & Allen in 1825, and dedicated to Sir John Malcolm. In the following year, the same publishers issued a very useful *Index to Names of Places in India*, which gave the longitudes and latitudes of 13,000 places entered on their map.[1] This was the first attempt of the kind; it served as a valuable aid in connection with any map of the country; and it is to be regretted that it has not been kept up to date, and extended by the survey staff.[2] Mr. Walker now began the sheets of the *Indian Atlas*, engraved on copper, on a scale intended to be the same as Arrowsmith's, but which has been found to

[1] Curiously enough, Mr. Walker's name is not mentioned on the title or in the preface to this volume.

[2] Wyld's *Index* (N.D.) was its only successor as a separate publication. In Dr. A. Keith Johnston's *Index Geographicus* (1864) about 8000 names from the map of India are inserted, with their latitudes and longitudes. The geographical positions given in the *Imperial Gazetteer* are stated, with an appearance of great exactitude, to seconds of arc; but as 1″ of arc is only 33½ yards, and 5″ only 168 yards, one can hardly understand why it should be attempted to lay down the position of any considerable town with this extreme accuracy; for, even on the 4 mile to 1 inch scale of the survey maps, a second of arc measures only $\frac{1}{211}$ or 0·0047 of an inch, and 5″ measure less than $\frac{1}{40}$ of an inch—a quantity much too small for practical purposes. But on comparing the positions given with the sheets, many inaccuracies are found in the larger division of minutes, and occasionally even in the degrees.

be of 1: 255,560, each sheet measuring 40 by 27 inches,[1] of which the first was issued in 1827, and up to 1868 he had published 84 sheets.

In 1868, the geographical department in the India Office was reorganised, and the preparation and engraving of the survey maps was transferred to India, and placed under the Surveyor-General. The older sheets have been again and again revised, and some of them re-engraved in quarter-sheets, while many others have been added. There is thus abundant material for a very complete map of India.

In using the sheets of the Great Trigonometrical Survey, however, it is to be remembered that the surveys, especially in the south, were made before the country was opened up by railways, and that these on the one hand, and famines on the other, have, in many cases, reduced towns that were of considerable importance eighty, or even fifty years ago, to insignificant villages, while others that were then small have since grown to large proportions. In compiling a general map from the survey sheets, therefore—such as Thacker's *Reduced Survey Map of India*—care has to be taken in the selection of the places. But the larger maps of the country, or of separate presidencies, issued from time to time by the Survey of India Office in Calcutta, can be relied on as presenting only places of importance now, and these can be supplemented to any extent by the district revenue survey maps, prepared by the different local governments.

The point of departure, or meridian of the surveys, is the Madras Observatory. Its longitude was first deduced by Goldingham as 80° 18′ 30″; but, in 1815, Lieut. Warren had charge of the observatory, and reduced this to 80° 17′ 21″, which was adopted by Lambton, and afterwards confirmed by Goldingham (1825-27); Colonel Hodgson made it 80° 17′ 9″·6; Mr. T. G. Taylor (1831-33) reduced it further to 80° 14′ 19″·2; and Major W. Jacob (1848-52) made it 80° 14′ 19″·5. The Royal Astronomical Society and the Admiralty have since, however, adopted a longitude, based on telegraphic communications, of 80° 13′ 55″·5 (5h. 20m. 55·5s.), thus requiring a correction of − 3′ 25″·5 to be applied to the longitudes on the survey maps.[2]

II.—*Place-Names.*

In representing place-names, two distinct systems have been followed by different individuals, the one often called (or miscalled) the "phonetic system," and the other the "Jonesian," or "scientific system." If it is borne in mind that the purely Indian languages have alphabets quite equivalent in every respect, and which are perfectly phonetic, it will be readily understood that an accurate transcription of a name in any of the languages from Hindi to Malayâlam [3] must be a phonetic representation

[1] Each sheet covers 1° 26′ of latitude, or 98·59 English miles by 153·24 miles in width (equal to about 2° 13′·6 at the equator). The axis of the projection is the meridian of 76° 30′ E. longitude. See Colonel Walker's *Memorandum* in Markham's *Memoir*, pp. 434 ff.

[2] Dr. A. Keith Johnston's map in the *Royal Atlas* took this correction into account.

[3] Urdu, with its Persian alphabet, is excepted thus far, that a knowledge of the pronunciation or a careful marking of the vowel-points (usually omitted) is necessary to accurate transliteration.

of it. But if we remember, also, that in English, every vowel and combination of vowels, and several of the consonants, have a variety of different sounds, and that thus various characters may be used to represent the same sound, it is evident that spelling by the sound, or "phonetically," is not at all so simple a matter as people erroneously imagine. But it becomes a much more uncertain method when it is considered, further, that few people can spell a word "phonetically" which they cannot readily pronounce—and that the uneducated Hindu is not more accurate in his pronunciation of place-names than the natives of Britain generally are. How would some Englishmen spell by the ear the Scottish word *loch*, or the Irish *lough*, or even the varied forms which the name "Edinburgh" takes in the parlance of many of its inhabitants? Spelling place-names by the ear is a delusion that has been idolised. In India, Orme wrote *Cawn* for "Khân," and Dow, *Chan*, each believing his own form to be the phonetic representation; so also we find—Decan, Dekkan, and Deckan; Cuncan, Concan, and Konkan; Tanjaor, Tanjowar, and Tanjore; Guzaratte, Guzuratt, and Guzerat; Naugracut, Nagercot, Nigracut, and Naggercote; Cachemire, Cashmeer, Cassimere, Kashmir, and Kasmir; Masulepatam, Matsulipatan, Massalapatan, Masulapatan, Masulipattam, Machalipatam, etc.; Crotchy, Currachee, Kurrachee, Karanchi; Chandis, Kandis, Candis, Khandes, Kandeesh, etc.; Pengab, Penjaub, and Punjab; and hundreds more might be given of what were honestly written down as "phonetic" spellings.

If such a system were applied to the place-names of any country the result would be the same—very few names, indeed, would be written exactly alike by all. When such is the case, reluctant though many are to admit that it must be so, what use is there of clinging to it? Scholars have long seen that transliteration is the only system of attaining uniformity. The Germans and French have adopted it in their maps of Oriental countries, each people transliterating according to the sounds of the Roman letters in their own speech, and so using *Dj* for our sound of *J*, *ch* (French), *sch* (German), for our *sh*, etc.; and, in copying their work, our map-makers print *Djebel*, *Djiddah*, *Tchar*, *Djihoun*, *Tchasch*, *Chouman*, and the like forms, which can be better expressed, for English-speaking people at least, by the forms that we are somewhat familiar with, viz.—*Jebel*, *Jiddah*, *Char*, *Jihun*, *Chash*, *Shuman*.

In India, Mr. N. B. Halhed, in his *Code of Gentoo Laws*, published in 1775, proposed a systematic transliteration on a method that required double letters for five of the vowels, and every vowel to have its long or short mark; it used *ĕ* and *ā* for the short and long sounds of the same vowel, and *ī* for the diphthong *ai*, while the hard and soft *d*, *dh*, *t*, and *th* were undistinguished. Sir W. Jones, in 1788, improved greatly on Halhed's representation of the vowels, by substituting single Roman letters for each, marking the long ones only by an accent or other mark, and distinguishing the palatal consonants by a dot: its weak point was the adoption of *c* for the hard sound of *k*. He adapted it also for the sounds used in Arabic and Persian, and it was largely employed in dictionaries and scientific publications. Dr. J. B. Gilchrist, in 1796, propounded a rival system, resembling Halhed's, but substituting *u* for

the short or shut vowel *ă*, which recurs so frequently in Sir W. Jones's sentence—"a mother bird flutters over her young"—where it is represented by five different letters and by *ou*. For the usual sound of *ai* Gilchrist employed *ui*, and for the short *u* an entirely new letter formed of *oo* stuck together, the long sound being represented by *oo*; and, of course, as printing presses had not his combined *oo*, the short and long vowels were printed and written alike. He urged that as the work was for British subjects only, there was no necessity for considering general or continental convenience—an instance of narrow insular prejudice. Inferior as his system was, the leaning of the public was towards it, or rather towards what it was ignorantly supposed to be; for, instead of studying and mastering it, it was "more congenial to the natural indolence and self-sufficiency of writers on Indian subjects to study neither Jones's nor Gilchrist's systems, but to blunder on without any previous preparation, to put down words at random, and to mystify the public with all sorts of incongruous creations." [1]

In 1820 Government wanted a record to be drawn up of the land tenures, and uniformity of spelling the terms and place-names became important. The Record Committees adopted a modified (not an improved) form of Gilchrist's system, which was used also for maps and revenue survey records. Place-names were altered, but hardly *corrected*. Indeed, a map of the Doab, prepared by the Surveyor-General from materials in his office, presented the road from Kanhpur to Akbarpur as double:—being taken from two route surveys, the compilers had not discovered that the routes were the same, because all the names were spelled differently.[2]

This state of matters continued till 1834, when the Rev. Mr. Thompson published his *English-Urdu Dictionary* in Jonesian Roman type, and an effort was made to introduce largely this Romanised alphabet into school-books and other publications. Mr. H. Thoby Prinsep maintained the superiority of Gilchrist's system, and said the Jonesian was a style of writing to be reverenced and respected, but not imitated, and that it should be reserved for recondite science. The late Sir Charles Ed. Trevelyan replied that Dr. Gilchrist's was not a system of orthography, but of *kakography*, or of confusion, mystification, and absurdity. Competent scholars from different missions—Drs. Duff and Yates, Messrs. Pearce and Thomas—sided with Sir Charles Trevelyan; and, finally, Dr. Duff's modification of the Jonesian system was approved by the Calcutta Bible Society, and was soon universally adopted by the missionaries in the Upper Provinces, and published for use in the surveys by Colonel (now Sir) Henry E. L. Thuillier, in his standard work, *A Manual of Surveying for India*, which contains a section on the question of orthography, in which surveyors of all persons ought

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[1] Professor H. H. Wilson, in *Glossary of Indian Terms*, pref. p. vii.

[2] The principal names were, on one route,—Kuttra, Chichehree, Bhysowr, Futtipr, Raneea, Oomrun, Akberpoor; and on the other, Gittera, Chichindy, Bheisawn, Futtehpr, Runneah, Oomeron, Akbarpoor,—the relative distances of the places in each list being the same.—*Jour. Asiat. Soc. Bengal*, vol. iii. p. 285.

to be most interested and concerned. These controversies, and the favour of Government for the so-called "phonetic" system from 1820 till at least 1850, prevented any uniform method of spelling being introduced. But, though, when Mr. Ed. Thornton compiled his *Gazetteer of India* in 1854, he gave up the spelling in despair, and placed "Amritsar" in the first, and Ambāla (as "Umballa"), beginning with the same syllable, in the fourth volume of his work, spelt *Fath* eleven different ways all wrong, and wrote a town and its district of the same name quite differently—yet elsewhere progress was, on the whole, being made in extending the use of the modified Jonesian system.

The late Professor H. H. Wilson remarked that a traveller in a western country "endeavours to obtain the most correct denominations of the places he visits, under pain, if he publish any misnomers, of being denounced as an ignoramus"; and a surveyor or geographer "will, as far as he is able, correct or verify the nomenclature of travellers by a reference to native appellations." But, he adds, "although the business of geographical description is thus perfectly understood in Europe, it appears to be utterly unknown in India. A knowledge of the native languages is evidently regarded as no part of the qualifications necessary for such investigations; and it does not seem ever to have been thought worth while to report correctly the sounds uttered by native informers. The reply to the question as to the name of any particular place has been put down with a most noble disregard of accuracy; and the maps of India present accordingly a heap of names that would be just as appropriate in England or America, as in Hindustan. It is unnecessary to notice how exceedingly disreputable this is to Anglo-Indian geography; but it is the more unfortunate, inasmuch as the names are in general significant, and, if accurately expressed and understood, would convey some useful information as to the peculiar site of the places mentioned or the history of their vicinage. It is also the less excusable, as there are few places where some person might not be found capable of writing the name of the place and explaining its import; and there is no want, if inquiry be duly made, of tracts that furnish very tolerably correct lists of the principal divisions of the country. That these tracts are not procured, that the written native names are not read, are omissions of which the character is sufficiently obvious."[1]

Of the necessity for some reform of such a state of matters in the spellings on our maps, with the view of making an approach to uniformity, the following examples, selected almost at random from the Great Trigonometrical Survey maps of the northern districts of the Madras Presidency, may be sufficient evidence:—

On the Map.	Correct Transcription.	On the Map.	Correct Transcription.
Akeed.	Akuvídŭ.	Bemedavole.	Bhímaduvolŭ.
Audamellee.	Adamalle.	Ausuntah.	Áchanta.
Augerpully.	Ákiripalle.	Bobellahpaudoo.	Babbellapádu.
Bagallu.	Chágalla.	Boodand.	Búdavádŭ.

[1] *Oriental Magazine*, vol. ii. pp. 186-187.

On the Map.	Correct Transcription.	On the Map.	Correct Transcription.
Chebal.	Chebrolŭ.	Mamedada.	Mamidivâda.
Chicacole.	Shríkákola.[1]	Neppa.	Leppa.
Chunganoor.	Shenganúr.	Oopako.	Upmáka.
Concole.	Kánukollŭ.	Pallashim.	Pattesham.
Cullakoont.	Vúlikunta.	Paltambra.	Talatampara.
Deorpali.	Devarapalle.	Payakairoo.	Pekeru.
Doomtally.	Dontali.	Pidimandasa.	Píramambúsha.
Dowlaishweram.	Dhavaleshvaram.	Plaspooram.	Paláshapuram.
Gargupilly.	Garugubilli.	Rallee.	Ryáli.
Ingeeram.	Injiram.	Sapochola.	Sábakota.
Ippurroo.	Vipparru.	Streevygoondum.	Shrívaikuntham.
Iyeloor.	Ayilúrŭ.	Thyadeemulla.	Tadimalla.
Kakeerana.	Kokireni.	Tricknaungoody.	Tiru-Karangudi.
Kaudaloor.	Kájalúrŭ.	Taidoor.	Tállúr.
Kerlure.	Kírayúr.	Tundakulpoodee.	Tadakalapúdi.
Koodavillee.	Kumadavilli.	Uttellee.	Attili.
Kundavellee.	Khandavilli.	Uzzamoor.	Ajjamúrŭ.
Masarum.	Machavaram.	Vissiavethee.	Vijayapati.
Mingoor.	Minjúr.	Weeyoor.	Vuyúrŭ.
Moogetalah.	Mukhtiyála.	Wodagaricem.	Vaddigúdem.
Mullaily.	Mallavilli.	Yahdavole.	Yádavolŭ.

Hundreds such, and many worse, might easily be culled from any of the sheets; but comparison of the names here will show at once the utter absence of any system of transcription; syllables are transposed or omitted, sounds inserted or altered; and, where every name has a meaning in the vernacular, an effort might surely be made to preserve it on its introduction to the outer world.

In November 1864, the writer reopened the question in the Bombay public press, advocating a consistent system in place-names: but absence from India interrupted his plans. While in Scotland, he conferred with Dr. A. Keith Johnston on the preparation of his map of India for the *Royal Atlas*, and, supported by Sir H. Thuillier, got him to adopt to some extent the scientific spelling, in many cases inserting both forms. This map, on a scale of 1 inch to 70 miles, was the first really good map of India published in Europe; the 8330 places inserted were selected with care, and it was well engraved. In January 1868, as Secretary to the Bombay Geographical Society, the writer submitted a plan for a proposed Index or List of Indian Geographical names, based on a uniform system of transliteration, which was approved of, and correspondence was opened with Government for aid in the compilation of such an index in vernacular and Roman characters.[2] In response the

[1] The difference between the lingual and palatal *sh* is almost the only serious difficulty in transliteration into Roman characters. The lingual is naturally represented by *sh*; for the palatal aspirate the French use *ç*, and others the Jonesian *ś*, but where no diacritical mark is used *sh* is our nearest representative.

[2] See Markham's *Indian Surveys*, second edition, p. 395; and *Trans. Bombay Geograph. Soc.* vol. xix. p. xlvii. A specimen index of towns, villages, etc. in the Puna district, was published in the same volume, pp. 39-120.

Government of India, on 30th April 1868, invited aid from the local governments in the preparation of it.

But the local governments were slow in moving; and in 1869, Dr. (now Sir) William W. Hunter, was appointed to compile the *Statistical Account of Bengal*, and was instructed to use his exertions to secure uniformity of spelling in this and the other provincial gazetteers then in preparation throughout India. Professor H. H. Wilson's modification of the transliteration system of Sir William Jones was also recommended for adoption. A splendid opportunity was here afforded of introducing, once for all, uniformity and accuracy into the spellings of Indian place-names;[1] he possessed every official facility to obtain correct information, and it is to be regretted that it was not taken advantage of. Even in the case of established forms, the Rev. J. Barton, M.A., clearly pointed out in 1871 that the claims of accurate scholarship and popular usage might be reconciled in a gazetteer by placing in each case the scientific spelling, in brackets, after that in common use. This, if done with scholarly care, would have marked a distinct advance, and would doubtless have prevented the numerous new misspellings in Sir W. Hunter's work.

Dr. Hunter, instead of accepting Wilson's system, adopted a plan which he considered a compromise, in which mongrel forms, like *Cawnpur*,[2] were admissible, and he prepared lists professing to show "the true spelling of all post towns and villages in India." These spellings seem to have been sent in by postmasters and the like, perhaps not always natives of the district nor men of any education; and as every one knows how such men misspell names even in their own tongue and alphabet, it need hardly be said that many of them were incorrect. When the *Imperial Gazetteer*, therefore, came to be compiled on the basis of such lists, its spellings could have no authority; while many are wrong, and quite disguise their etymologies. Practically no *systematic* transliteration is adopted; spellings are changed, but not always for the better—for example, *Cooum* is put for the older "Coom," but is not much nearer the correct form of Kuvăm; *Kondavir* is substituted for "Condavid," when Kondavíd would have been correct; *Kátwá* is put for "Cutwa," but others like it (*e.g.* Kambham for Cumbum), are not altered on the same principle; Bukkaráyasamudram is wrongly altered to *Bakkarayasamúdram*, Baikunthapur to *Baikanthpur*, Balighattam to *Balighatiam*, Botáwad to *Botwad*, Ajaya to *Adjai*; *Betúlpiudangadí* is put for Vettatt-pudiangádi, *Kandapur* for Kundapur;[3] while Jaypur ("Jeypore," "Jaypoor") is made into *Jaipur*; Gudiyáttam is changed to *Gudiátham*; *Bhartpur* is put for "Bhurtpore," instead of Bharatpur; and *Hampi* for Hampe, *Ahobalam* for Ahobilam, *Basinakonda* for Bashimkonda,

[1] It is not to be understood that names so long fixed in popular spelling as Calcutta, Bombay, Madras, Allahabad, and the like, would have been displaced.

[2] "Cawnpore" only came into general use at the time of the Mutiny (1857); previously it was usually spelt *Caunpoor*, and sometimes correctly *Kanhpur*. It is derived from Kanha, a name of Krishna.

[3] It will be observed that the new forms in the *Imperial Gazetteer* generally alter or greatly disguise the derivation of the names.

Cáliyán for Cháliyam, *Bhilolpur* for Bahlolpur, *Atcháveram* for Achavaram, *Contai* for Kánthi, *Bellágupa* for Belaguppa, etc., etc. Accents are employed to denote the long sounds of the vowels, but they are unfortunately often wrongly placed and misleading, *e.g.*, *Anantápur* for Ánantapur, *Antrávedi* for Antaravédi, *Avúlapalí* for Ávulapalle, etc. We have variant forms, as "Sindia" and "Sindhia"; "Gujerát," "Guzerát," and "Gujarát"; "Bishan," "Bishen," and "Bishnu," etc. *Fateh* is used for *Fath* or *Fathe*, *-drúg* for *-durg*; and *peta* and *petta*, *páli*, *palle*, and *pallí* are used almost indiscriminately. Other forms are occasionally given in brackets after the adopted one, but these are sometimes the vulgar spellings; at others the correct transliteration, and sometimes a new and incorrect spelling.[1]

One feels that advance has thus been seriously retarded in the spelling of place-names by this important and otherwise valuable work. Had spellings only been altered so as to bring them nearer to the system of transliteration of Jones and Wilson, or, where this could not be done with certainty, left alone; or, better, had the correct transliteration been always given in brackets, the contribution to a knowledge of Indian place-names would have been invaluable. But the professed authority of the spellings in the work is calculated to mislead, and will mislead, while they render it all the more difficult to obtain currency for the correct forms—which, at least in all places of less note, it was so desirable to employ in such a work.

Fortunately, the *Bombay Gazetteer* is a more scholarly work, and the spellings in it may generally be depended upon; while, for the Bombay Presidency exclusive of Sind, the *Postal Directory*, compiled by H. E. M. James, Esq., Bo.C.S. (1879), gives the names of *all* the towns and villages in that postal circle, transliterated with a degree of care and accuracy that is exceptional. Mr. James modestly confesses that "there must be many defects in the first edition of such a work," and asks for "corrections and additions from district officers and others." In the first edition of a list containing 42,000 place-names, with the *zilá*, *taluka*, and post town for each village, we must expect errors.[2] Mr. James at first intended to prepare this *Directory* in English and vernacular, but on grounds of economy he subsequently restricted it, unfortunately we think, to English only. Lists, compiled with equal care and accuracy,

[1] Thus, to take a few examples from the Madras Presidency only,—we have Coonoor (*Kunúr*) for Kunnúr; Coringa (*Koringa*) for Korangi; Combaconum (*Kumbhakonam*), a Sanskritised form, for the Tamil Kumbagonam; Satyamangalam for *Sattiyamangalam*; Panroti (*Panrutti*) for Pannurutti; Parmagúdi (*Parambakudi*) for Paramakkudi; Shermadevi (*Sheranmahádevi*) for Shermáthevi; Sriperambúdúr or *Sriperumátúr* for *Siripperumbúthúr*; Púdúkattái (*Poodoocottah*) for Puthukkottai; Pálmaner (*Pálamainer*) for Palamaneri, etc. We have also Pápanásham for *Pappavinásam*; Ambúr for *Amúr*; Núzvíd for *Nújivíd*; Sankaranainárkoil for *Sankaranayinárkkovil*; Srívillipatúr for *Sirivillipputtúr*; Virudupati for *Viruthuppatti*; Udamalpet for *Udumalppettai*; Chittoor for *Shittúr*; Shevaroy for *Shervaráy*; Viruddháchalam for *Viruttáchchhalam*); Tirupati for *Tiruppathi*, etc., etc. Gadak or Gadag, 43 miles east of Dharwar, is described under the name of Garag, which is a small post town 10 miles NW. of Dharwar.

[2] Under the letters E, F, and U, there are some names that properly belong to I, Ph, and A, respectively.

for the other Governments of India would be of immense value, not only to the postal service, but to every department of government, and to both the scientific and general public. Broken up into shorter alphabetical lists for the different districts or *zilâjat*, they might be employed in tabulating the census returns; they would form the best of all bases for an Index to the maps of the Great Trigonometrical Survey, and for a guide in correcting the spellings on them; and for office reference at all times. The English spellings would require no diacritical marks except on the long sounds of *a*, *i*, and *u*—provided the name were also given in vernacular characters, which is easily secured in the first compilation, is an effective check on misprints in the Roman character, and a *sine quâ non* for perfect accuracy as well as for etymology. The ease or difficulty in securing correct spellings in such lists centres in the ability and energy of those employed in the different districts to prepare them for the press. It is not the village postmasters and pupils of Government English Schools, however, that should be depended on for correct spellings, but the old headmen and Brahmans, who are natives of the districts and know which are the true forms.

There is a rapidly developing demand that place-names everywhere should be correctly represented. In Ireland no expense was spared by Government in employing competent scholars to aid the Ordnance Survey in securing the correct spelling of Irish place-names; and for the revision of the maps of the Highlands of Scotland the Director-General of the Ordnance Survey has asked the co-operation of the Royal Scottish Geographical Society with respect to Gaelic and Norse place-names. But a far wider movement, to the end of securing accuracy in the place-names of all countries, is elsewhere taking shape, and must rapidly spread. Nor have the Indian Government Surveys been of late altogether indifferent to the matter. The later maps are greatly better than the older ones in this respect, showing that care has really been given to the spellings. But the results of long-standing neglect have yet to be looked to. To re-engrave a hundred or more of the large sheets is not asked; that may, and perhaps for other reasons must, be done by-and-by.

Meanwhile there are no indexes of geographical positions. These are greatly needed, and should be prepared in the survey offices; while, concurrently, lists for each *pargana*, *taluka*, and district should be collected, giving the correct vernacular and Romanised forms, from which the map-spellings would ultimately be corrected. These lists, combined with the positions, would serve the important purposes already referred to; and, when a map had otherwise to be re-drawn, they would be ready to hand. Such an index for the whole of the survey maps, and slightly expanded to form a condensed but complete *Gazetteer of India*, giving the geographical position, population of towns and villages, heights of mountains, and ever so little other information, would be invaluable for office and general reference both in Europe and India. It surprises one that such a work has never been prepared.

Thacker's *Reduced Survey Map of India* (1891), prepared by J. G. Bartholomew, F.R.G.S., already referred to, is on the same scale as Keith Johnston's *Royal Atlas* map—that is, of an inch to a degree of latitude.

It is beautifully engraved, but without the hill-shading, and has been constructed with special reference to Hunter's *Imperial Gazetteer*,—every place mentioned in that work being shown on this map. It thus contains ten thousand names,[1] all spelt as in the *Gazetteer*, and forms a necessary and valuable accompaniment to it. The index, which is very full, presents the same spellings, and thus helps to disseminate and perpetuate their errors. In the interests of science it is earnestly to be hoped that when a new edition is required, these mispellings will be revised, and the correct forms given at least in the index. In a gazetteer or an index, it would be well if the description or position were always given under the correct form, and the inaccurate only with a reference to it, and perhaps only when in the alphabetical arrangement it stood more than a few lines from the other.[2]

The *Imperial Gazetteer* itself, however, is only provisional, and it differs in the place-names from the provincial works. When it comes to be revised (as it soon must), if the work is intrusted to a scholar, the new-fangled Hunterian place-names must be displaced. No better method, perhaps, could be devised than that employed by Professor H. H. Wilson, in his *Glossary of Indian Terms*, in which he arranged every article alphabetically under its correct transliterated spelling, and at the end of the work gave a list of the variants with references to the proper pages. This enables the reader to find at once what he seeks for and shows him—if it does not also encourage him to use—the correct forms. Accuracy would not be at all a serious or confusing element, as some thoughtlessly suppose. Many names, long and widely known, have been, and still are, spelt in various ways, some nearer the correct form than others, and the adoption at once of that form could hardly in any case lead to a mistake. Katiwar and Kattywar have lately all but disappeared in favour of *Kathiawar*, and many names have in recent years undergone even larger changes for the better, while there are hundreds of names that would suffer less change if spelt correctly. Further, why should we accept the new-fangled "Narbadá" rather than the proper *Narmadá*, or object seriously even to the restoration of *Mathura* for Muttra, *Kachh*, *Bet* for Beyt, *Bharoch*

[1] Notwithstanding that there are about 1700 more names on this map than on Dr. Keith Johnston's, it would appear, from a comparison of the first three columns of the indexes, that about a sixth of those on the latter are not found on the new map, nor, consequently, in the *Gazetteer*. A proportion of these may be due to differences of spelling, and some few may be places of very little note; but others better deserve a place than perhaps a tenth of the names entered in the *Gazetteer*. There are about 5200 names in the index to *The Student's Geography of India*, by Dr. George Smith (1882).

[2] For library and office use there was published, fully thirty years ago, by E. Stanford, *The Atlas of India; revised by J. Walker, Esq., selected from the maps published under the superintendence of the Society for the Diffusion of Useful Knowledge* (N.D.). This contained India in twelve sections, to a scale of 35 miles to an inch, with an index map, and thirteen others of Afghanistan, Persia, Egypt, China, Japan, etc. This Atlas was a second edition (the first containing India only), in which the maps had been in whole or part re-engraved. Owing to the scale, fulness, and clearness of the maps, and convenient size of the volume (9 inches by 14¼), the work was very useful and popular; even yet, though out of date, it has not been superseded; and a new Atlas of similar character, the maps being to a scale of about 30, 32, or 35 miles to an inch, equally clear, with better spellings and an Index, would be most valuable for general use, and to officers in India, as well as to all tourists and students.

for Broach or Baroch, *Bor-Ghát*, *Katak* for Cuttack, *Jaypur*, *Qándahár*, and the like? If only employed in maps, in gazetteers, and handbooks they would be readily accepted; and, in the case of less notable places—post towns, railway stations, rivers, hills, etc.—if they were spelt correctly on post-office stamps, time tables, district reports, census and revenue returns, as well as on maps, they would be at once accepted and gain currency. The Great Indian Peninsular Railway, not very long since, changed the spellings of nearly all the names on station sign-boards to the transliterated Marathi spellings, and no inconvenience was caused. When once a correct form has been current for a few years all aliases can be dispensed with, and will naturally disappear. Government could easily bring all this about through the means and agencies already indicated.

THE ORTHOGRAPHY OF AFRICAN NAMES AND THE PRINCIPLES OF NOMENCLATURE.

By W. A. Elmslie, M.B., C.M.,

Livingstonia Mission.

Nearly fifty years ago the question of the introduction of a uniform orthography for all the cognate languages and dialects of Africa was taken up and discussed in connection with the work of various British, American, and Continental Missionary Societies. The *Standard Alphabet* of Lepsius, the use of which would have harmonised all publications issued under the auspices of the various societies, was recommended for adoption, but was not generally accepted. This was at a time when African philology was in its infancy, and when the most favourable opportunity presented itself for introducing uniformity. It was allowed to pass unimproved, and now, instead of a uniform system of orthography within the field of Bantu languages, we have four or five different systems in use.

Since African philology has assumed a leading position in connection with the development of the country, these variations in orthography present themselves as confusing and retarding elements in the work. These elements will be more apparent year by year. Hitherto, for the most part, only one missionary society has been working with a given language, but now that Africa has been divided among the various powers, and the most natural boundaries have not in every case been followed in this partition, different nations with different orthographical systems may soon be found working with the same language. As an example, we require only to think of the Nkonde region at the northern extremity of Lake Nyasa, which has been so unnaturally divided between Britain and Germany, where henceforth their missionary societies will be labouring with different systems of orthography in the same or allied dialects.

But the want of a uniform orthographical system is not regrettable merely because of its relation to missionary effort. The various societies

are not so likely to feel it as the African himself, and as the various commercial and international interests will. We cannot but see that, when the friction of the present operations of the Powers has disappeared, there will be a more general community of interest than is now apparent. The African, though he has been educated in one mission, will be found making his home near another, and he will be handicapped by the differences in the languages which have been created by Europeans.

The best authorities are agreed that Africa will only be developed by utilising native forces, and, though it may appear a small matter, the want of a standard uniform system of orthography will be found to be a hindrance to international progress in Africa.

These remarks apply to the general field of languages, but in the limits of the present paper we must leave the general question and confine ourselves to it as related to the British sphere, and particularly to the nomenclature in connection with geography.

Since the time when Livingstone discovered Lake Nyasa, and helped to fill up the blank in our maps of that time, some ten or twelve different workers have been engaged in Nyasaland, and the fruits of their labours have been embodied in published maps of that region. It is not to be wondered at that there should be some confusion in connection with the nomenclature adopted by the various workers. The wonder is that there is not more. But, if at present there is no hope of attaining to a uniform orthography internationally, we may at least endeavour to ensure uniformity within our British spheres, and with this aim the following remarks are put forward, as the present is certainly the most favourable time for united action.

A cursory glance at the various maps shows that, while many of the names which appeared on the older maps have been retained, other names have been inserted along with these, on the newer maps, while there is nothing to indicate what relation they bear to each other. There is, in several of the maps, no proper distinction made between the name of a village, a chief's name, or the name of a district.

We are, of course, approaching a more perfect knowledge of territories, and, instead of having maps merely showing the general features of a country, we are acquiring more detailed information, and are able to issue maps on a larger scale, which correct the errors of, and supply the features wanting in, the older ones.

The orthography of African names does not seem to require revising so much as the system of nomenclature, and yet upon the orthography the correct pronunciation of the names depends, and to the general reader this presents some difficulty, which we think may be easily cleared away.

There is no need to adopt a new alphabet, as by means of the Roman characters every sound may be expressed. As Nyasaland is the field more especially under review here, we may say that all its languages are closely allied to each other, excepting the Ngoni [Zulu], regarding which we need say nothing here at present.

Having fixed upon the Roman characters, we must next see how they are to be used. Some travellers have adopted certain combinations of letters, and introduced diacritical marks in connection with names, while

other travellers have made use of neither in indicating the same sound. Is a uniform method possible and practicable? After seven years' work on Bantu languages we think it is, for all Nyasaland languages. The plan here advocated is not new; it is simply the basis, according to which all names have, to some extent, but not exclusively, been written, reduced to uniformity. We may consider:—

1. Consonantal Sounds.—All the consonants are not required to indicate sounds met with, as we shall see, but the rule is that they are sounded as in English, except the following:—

(1) *C*—The soft sound of *c* is correctly represented by *s*, and its hard sound (as in English words) by *k*. It is therefore redundant. (It is used in Zulu, etc., to represent the dental click). The combination *ch*, as in *monarch*, is represented by *k*, and as in *church* by *tsh*, in conformity to the phonetical principle advocated.

(2) *G*—Its sound is always hard, as in *give*.

(3) *Q*—This letter is redundant, as the English combination *qu* is correctly represented by *kw*.

(4) *X*—Is redundant also, as *ks* represents the English sound of this letter.

We are thus able to discard the use of *c*, *q*, and *x*, and are still left with means to express all simple sounds met with in African names.

Various compound consonantal sounds are met with, which, however, do not present any real difficulty. They are chiefly a combination of a nasal with another consonant, such as *ng*, *ny*, *nd*, *nj*, *nk*, and *mb*, *mf*, *mp*, etc. These have the same sound as in common English words. The sound of *ng*, as in *singing*, is met with. Where *n* is combined with *g* or *k* it has frequently this sound, but we meet with the sound where no *g* or *k* has to be sounded in combination. This sound has been written *ng'*, but it is of rare occurrence in connection with geographical names, and may be put aside.

2. Vowel Sounds.—The vowels have the open Italian sound—

a, as *a* in *father*.
e, as *a* in *save*.
i, as *ee* in *seen*.
o, as *o* in *bone*.
u, as *oo* in *moon*.

The diphthong sounds will be referred to presently.

3. Accentuation.—Since each letter has only one sound, and as the accent always falls upon the penultimate syllable, the use of accent marks and double vowels indicating where the accent falls is entirely unnecessary.

All syllables end in vowels—*i.e.* are open. If we remember this characteristic of all Bantu languages, we can dispense with the use of double letters, and may always at once place the accent on the proper syllable. This will be evident from the following examples:—

Nyassa is variously pronounced as *Nee-as-sa* and *Ny-as-sa*, etc. Being a word of two syllables, the correct pronunciation is at once apparent according to the foregoing method. The open syllables are *Nya-sa*, and therefore a double *s* is unnecessary. Again, *Bandawe* is often pronounced as if it were *Band-awe*. To correct this, an acute accent was placed over the final *e*, but this led to the opposite extreme of making it *Ban-da-wee*. Its syllables are *Ba-nda-we*, and its correct pronunciation evident.

This rule as to open syllables is so universal, that, although use and wont is an excuse for continuing *Nyassa* instead of *Nyasa*, it is surprising to find on the latest map of the "Stevenson Road" country (*Scottish Geographical Magazine*, June 1890) such names as *M'kanna*, *Nsessi*, *Suwissi*, etc.

With reference to accentuation and, consequently, correct pronunciation, the question of diphthongs comes up. After an extended investigation we have found extremely few pure diphthongal sounds which cannot be expressed by means of the semi-consonants *w* or *y*. Though it may seem to be simpler to let two vowels stand together, it is not so, according to the system here advocated. Although *ia* and *ua* when quickly sounded are the same as *ya* and *wa*, and, when occurring in the first syllable of a word, may not in any way affect the pronunciation, they cannot appear in the final syllables without doing so, unless an accent mark is used with one of them. On the map already referred to we meet with names with *ia* occurring in them, where, from the pronunciation, it is known that it is sometimes representative of one syllable (*ya*) and sometimes of two syllables (*i-a*), but there is nothing to indicate the distinction.

The use of *ya* for *ia*, and *wa* for *ua*, as one syllable, obviates the necessity to use accented vowel-characters. Krapf pointed out that *ua* does not represent *wa*, though *oa* [as in the old spelling of Loangwa (Loangoa)] may.

The foregoing plan is consistent with that used by all the missions in British Central Africa. We may now pass on to consider the question of nomenclature.

1. Place-Names.—There does not appear to be any universally recognised system, even within the British sphere, and the present time is most favourable for considering what should be the basis of a scientific and simple method. As our knowledge of the country and its inhabitants increases, we shall be able to eliminate all names which are either obsolete or out of place on the maps. It is evident that there is need for some uniform system, as we find that sometimes a tribe or town is named according to the name of the chief and, in other instances, according to that of the district in which the people live. We come across such a word as *M'Pangara* on the map, and, on referring to the text accompanying it, we find it written *Mwenepangara*. In the one case we are left to wonder whether *M'* is equivalent to the same character used in Celtic names, and in the other to believe that the name of the chief is *Mwenepangara*, neither of which is correct; but how are we to know that?

Most of the names on our maps of Nyasaland are not the names of the towns at all, but of the chiefs or headmen. Such a plan may be suitable for maps on a small scale, but the danger is that it may be erroneously carried into more detailed maps, where it is not suitable or expedient. To say that a certain town is *Mwenepangara* surely is not the best way to mark it, when we know that *Mwene* [*mwini*] means "chief," or "Mr.," and *Pangara* is the man's name.

In regard to the naming of districts, there can, we think, be no better or more scientific method than that employed by Mr. H. H. Johnston in his map (*Proc. R.G.S.*, December 1890), where the extended name in large letters is made to indicate the district to which it applies. On Mr. Sharpe's map of Southern Nyasaland, in the same journal, a district is indicated by the chief's name extended over it, but we see the result of not following a uniform plan; in the latter map, and also in the map of the "Stevenson Road" country already referred to, sometimes the chief's name is given, and sometimes the name of the district, and sometimes the tribal name. We are thus unable to say whether the name on the map signifies a tribe, a district, or the chief of a tribe.

It may not always be easy to get at the name of a town or district, but, nevertheless, there is a name, which patient investigation will bring to light, and that name should be adopted.

2. Tribal Names.—The confusion with these is very great. It is evident, from the names on the maps, that travellers have not infrequently given a tribe a name of the form used by their neighbours instead of that by which they designate themselves. The personal prefixes of the names show this in most cases, but in some cases another form of name is used: *e.g.* the *Ngoni* (*Abangoni*) are variously named *Mazitu*, *Maviti*, *Mangone*, *Angoni*, *Wangoni*. To adopt these various names in English is not only confusing but absurd, since they are the terms used respectively by the *Tumbuka*, *Tshewa*, *Nyanja*, *Tonga*, and *Nkonde* tribes.

Taking a few names of tribes on the Nyasa-Tanganyika plateau, we observe that they are derived from the name of the chief, or from that of the district, *e.g.*, *Wawandia*, *Awakukwe*, etc., but we can never tell which, and what is needed, therefore, is uniformity. Doubtless a tribe often speaks of itself as the children of so-and-so, naming their chief, but that is a mode which has become necessary by the conditions of life obtaining in their district. These names signify merely sections of what is certainly one tribe, though broken up by war, so that they require to call themselves the children of some one.

The tribal name will not always be found to be correctly given by the neighbouring tribes. A tribe living in a low-lying country speaks of the people on the highlands as "the people above" (*Awamwamba*), but that name should not be affixed to the people as their proper designation.

Having found the correct form of the tribal name, the next step towards simplicity and uniformity in nomenclature is to remove the variable personal prefix and retain the invariable stem of the word to denote the tribe.

In all the Bantu languages the principle of "Euphonic Concord" necessitates a classification of all nouns according to their prefix or initial letters. All personal nouns have in the singular the prefixes *Um, U, M,* etc., and in the plural *Ba, Ma, A, Wa,* etc., differing according to the tribal tongue. These prefixes are of course variable, but the stem is invariable. Hence a people may be variously named *Atonga, Watonga, Batonga,* and *Matonga.* A traveller's guides who belong to a tribe which uses *Wa* as the personal prefix will give their master the names of tribes met with, adding the prefix *Wa*; so also a guide who uses *Ba.* But these prefixes may be alien to the language of the people named, and are therefore inappropriate, if we consider that the local tribal name is to be chosen as the correct one. If we cut off the prefix, however, we have an unvarying stem which may be used, and this method, supported by such men as Lepsius, Krapf, Steere, Bleek, Hahn, and Cust, we recommend as at once simple, uniform, and universally applicable throughout the Bantu tribes. If it is adopted, many names must disappear from new maps, but that will make room for more correct or modern terms, and geography will gain by the change.

The use of the apostrophe has been erroneously introduced into several names, such as *Wa-N'Konde, N'Konde,* etc. No one knows the value of it in the name of the Nkonde tribe, and its use is confined to this tribe. *Wa* is the personal plural prefix, and *Nkonde* is the root, but some have struck off, as they thought, the prefix *N,* and named the tribe *Konde,* which is altogether incorrect. The method here pursued is a violation of the laws of the people's language, which we do well to note. The introduction of the apostrophe is a modern practice unsupported by necessity.

We have elsewhere recommended our plan for the names of the languages, in connection with which there is even greater confusion. It is in use, more or less, in connection with the better-known African names, and no one now questions the advantage of it. We do not speak of the "*Amazulu* people," but say "*Zulu* people." When we say "The English speak English," we know what is meant, and, instead of saying "The *Atonga* speak *Tshitonga,*" we may with equal clearness, and much more simplicity, say "The *Tonga* speak *Tonga.*"

Whether it is necessary, in adopting this plan, to affix an English plural termination (*s*) to the names, is a matter of opinion. We do not think it is so.

Towards a correct nomenclature the members of the various Missions may contribute largely. Their prolonged residence in, and close contact with, the various tribes enable them to arrive at correct conclusions, where the traveller may have mistaken his interpreter's meaning, or where, in transcribing his daily jottings in the course of a long journey, he may have allowed errors to creep in.

The subject is worthy of attention, and if the present attempt succeeds in raising the question our object will be attained.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The last ordinary Monthly Meeting of the Session was held in the United Presbyterian Synod Hall, on May 20th, when Professor A. Vambéry delivered an address on "British Civilisation and Influence in Asia." General Sir R. Murdoch Smith presided, and a cordial vote of thanks was awarded to Professor Vambéry on the motion of Dr. George Smith.

On the evening of the 22d, Professor Vambéry repeated his lecture before the Glasgow Branch of the Society, in the Hall of the Philosophical Society. Dr. Thomas Muir presided, and moved a vote of thanks to the lecturer.

The Dundee Branch met in the Kinnaird Hall on May 25th. Mr. W. Ogilvie Dalgleish, of Errol Park, presided. A vote of thanks to Professor Vambéry terminated the proceedings.

The Aberdeen Branch held a Meeting on May 26th in order to hear Professor Vambéry's address. Professor Pirie presided. A hearty vote of thanks was accorded to the lecturer on the motion of Bailie Crombie.

GEOGRAPHICAL NOTES.

EUROPE.

Phosphatic Chalk in England.—Deposits of this valuable agricultural fertiliser have recently been discovered near Taplow, in the county of Buckingham. Phosphatic chalk is found extensively in the north-east of France and in the neighbouring province of Hainaut, in Belgium, but it has not hitherto been found in England. Its value to the British farmer is so great that 40,000 tons are annually imported from France and Belgium. The deposits near Taplow occur in the cretaceous formation, in a section composed as follows :—Lowest stratum, flint-bearing chalk ; above that, a band (8 feet thick) of brown phosphatic chalk ; then 13 feet of flintless chalk ; then a second band (4 feet thick) of brown phosphatic chalk, above which come tertiary strata. On analysis it is found that this brown phosphatic chalk is a purely organic deposit, consisting partly of the shells of *foraminifera* and cretaceous molluscs, partly of the bones, teeth, and scales of little fish, which had probably been devoured by larger ones, and partly of the exuviæ of fish. The phosphatic chalk found near Taplow is considered to be equal in quality to that obtained from France and Belgium, which it closely resembles, and it is believed that further discoveries of it will yet be made in the chalk country of the south of England.

New Base-line for the French Triangulation.—During the summer of 1890 a new base-line was measured on the site of the old base of Picard. As one of the terminations of this line has been built over, two new points were chosen, the northern one 200 mètres to the north of the intersection of the Fontainebleau road with the road from Versailles to Choisy-le-Roi ; the southern to the north of the hamlet of Fromenteau, at the intersection of the Fontainebleau road with that from Fromenteau to Athis. After two measurements, the length was found to be 7226·792 mètres, and the error was probably less than a centimètre. This measurement agrees exactly with the base of Delambre, between Melun and Lieusaint ; but if the lines of junction with the triangulations of England, Belgium,

France, and Spain be calculated from this base, constant differences are found, amounting in the first case to $\frac{1}{35000}$ of the base.—*Le Tour du Monde.*

The German Census.—On December 1st 1890, the census of the German Empire was taken, and on that day the number of the population (including 2086 in Heligoland) was 49,420,972. The increase during the last five years (exclusive of Heligoland) was 2,565,268, or 5·47 per cent. Hamburg is the State which has received the largest addition to its population, the ratio being 20·36 per cent.; while in Mecklenburg-Strelitz there has been an actual decrease of 393 persons. The Prussian Monarchy contains 29,957,302 inhabitants; then follow Bavaria with 5,589,382, Saxony with 3,500,513, Würtemberg with 2,035,443, Baden with 1,656,817, and Alsace-Lorraine with 1,603,987. Each of the remaining States has a population of under one million.—*Deutsche Rundschau*, Jahrg. xiii., No. 8.

The Commerce of Germany with its Colonies.—*Le Tour du Monde* gives some figures extracted from the *Statistique de l'Empire Allemand.* The imports from West Africa (Cameroons, Togo-land, etc.) are valued at £218,160; from East Africa at £12,800; and from the colonies in the Pacific (New Guinea, Bismarck Archipelago, Solomon and Marshall Islands) at £500. The total is, therefore, £231,460. The goods exported by Germany to these colonies are valued at £249,236. Of this sum £208,240 represents the exportation to West Africa, £13,548 to East Africa, and £25,448 to the Pacific. The most important of the goods imported into Germany are coco-nuts, *copra*, vegetable butter, caoutchouc, and palm oil. Gunpowder, hardware, and brandy are exported to East Africa, and coal is sent to West Africa in exchange for ivory and coffee.

The Caucasus Railway.—Last summer the engineer, Rydsevsky, surveyed the country, and decided that the best route for this line runs from the Vladikavkas Station over the Arkhoti Pass to the Avtchali Station, about 8 miles north of Tiflis. From Vladikavkas the valley of the Kambilivka will be followed past the station Tarskaya, and a high ridge, an offshoot of the main chain, will be penetrated by a tunnel more than 6½ miles long, giving access to the valley of the Assa, a tributary of the Terek, up which the line will be carried to the foot of the Arkhoti Pass. Here a tunnel 7¼ miles long will be made, on emerging from which the railway will follow the valleys of the Khevsur, the Pshav, and the Aragva to the Kura, and will be connected on the Digomi plain with the Trans-Caucasian line. The highest points will be 5180 feet at the northern, and 4935 feet at the southern, end of the tunnel under the Arkhoti Pass, the height of which is 9343 feet. The line is to be constructed in 6½ years, and will probably cost 48,000,000 roubles (£7,500,000).—*Verhand. der Gesell. für Erdkunde zu Berlin*, Bd. xviii. No. 1.

ASIA.

Western Baluchistan.—Captain A. C. Yate, our Hon. Corr. Member, has sent us the following communication:—"The country that stretches from the border of Sind on the east to the Persian frontier on the west, and from the Gulf of Oman and the Persian Gulf on the south to Sistan and the Helmund River on the north, is becoming yearly more closely associated with the Indian Empire. Twenty years ago little was known of it, and the ties between India and the independent tribes that peopled it were of the slightest possible description. Since then, explorers, such as Sir Charles Macgregor, Captain Lockwood, Messrs. Floyer and de Windt, and Colonel Mark Bell have traversed it; and the Afghan Boundary Commission, on its passage to and fro between Quetta

and Herat, contributed to strengthen the relations of the Indian Government with a considerable section of its inhabitants. But it is mainly the diplomatic and administrative enterprise of Sir Robert Sandeman that has, during the last eight years or so, practically established British supremacy over Western Baluchistan. In fact, the whole of that dependency of the Indian Empire, which is now known to us geographically and politically as Baluchistan, may be said to be Sir Robert Sandeman's handiwork. The climate of Western Baluchistan is in the summer exceedingly hot, but in the winter it is very pleasant. It is true that the greater part of the country, owing to the want of water, is uncultivated, but it is by no means the desert that it is generally supposed to be, especially the portion about Kharan and Panj-gur. The northern portion bordering on the Helmund and the Reghistan (the sandy desert SW. of Kandahar) is little more than a desert. With the introduction of an improved system of irrigation, such as the Indian Government would introduce (similar to that in Sind, albeit Baluchistan cannot boast of an Indus), the fertility of the country would be greatly developed. Moreover, the establishment of a strong government means the suppression of inter-tribal feuds and reciprocal raids. Peace means prosperity and commerce. It is but four or five years since the well-known chieftain and freebooter, Azad, Khan of Kharan, died. His name and fame will long live among the Baluchis, but they will never see his like again. The days of great freebooters in Baluchistan are over. Not that it is to be expected that so extensive a tract, with a population so wild and independent, will be annexed without trouble. The recent murderous attack on Major A. Muir is an instance of what will, or may, happen. The importance of Western Baluchistan as a link between India and South-Eastern Persia, and between the Mekran coast and Sistan, must not be overlooked. There will be lines of railway through it ere long."

Central Asia.—At the commencement of the year the brothers Grum Grzhimailo returned to St. Petersburg from their journey across Asia, and M. G. E. Grum Grzhimailo read a paper before the Imperial Russian Geog. Soc., which was published in the *Izvestiya*, No. 3, 1891. Some of the discoveries related are of great interest. Perhaps the most singular is that the lower parts of the oasis of Turfan are below the level of the sea. Major-General von Tillo states in *Petermann's Mitt.*, Bd. 37, No. 5, that he has calculated the depth of Lukshin Kyr below the level of the sea to be about 160 feet. This spot is in 42° 30′ N. lat., and 89° 30′ E. longitude. Formerly extensive beds of reeds grew in all parts of the Turfan oasis. These have now disappeared, but where they grew water is still found below the surface, and it is drawn off by the natives for the irrigation of their fields. Where there is no subterranean supply of water, sand is gradually taking possession of the surface, and a great deal of land which was once green fields is now a barren waste. Advancing further towards the south, the explorers discovered the Tchol-tau and Tiu-ghe-tau mountains, parts of a vast range which, commencing at the Tarim river, extends north-eastwards to the mountains of Khami, and eastwards to the Ala Shan. It covers an area of nearly 154,000 square miles and, at its eastern extremities, contains summits rising to a height of 10,000 feet. To this range M. Grum Grzhimailo gave the name Pei Shan, or Northern Mountains, by which the Chinese distinguish its eastern portion from the adjacent Nan Shan, or Southern Mountains. Only one lake, the Tchagan Nor in the east, is to be found within the limits of the range, the small lakes marked in maps to the north and north-east of Su-chow having no existence. Of the lakes on the northern skirts of the range M. Grum Grzhimailo cannot speak with certainty, but apparently Shan Nor is still in existence. Another point to which

the Russian explorer drew particular attention is the tracing out of a Chinese military road, which runs from Lan-chow to Khami and Barkul. The natural history collections brought home contain 30,600 specimens; among them are four of the wild horses of Dzungaria, first discovered by Przhevalski and named after him. A large number of photographs were taken, and the meteorology, etc., of the region traversed were carefully noted. M. Grum Grzhimailo's journey, in which he travelled nearly 4000 miles by new routes, will contribute a large quantity of new data for cartography.

The Lake Aïbu-Ghir, Sea of Aral.—M. Éd. Blanc, in a letter to the Paris Geog. Soc. (*Compte Rendu*, No. 6, 1891), announces the discovery of a lake of fresh water to the south-west of the Sea of Aral. Twenty years ago a long and narrow gulf named Aïbu-Ghir figured on many of the maps of this district, but after the Khiva expedition had marched in 1872-3 from the Urals to the mouth of the Amu Daria without encountering this gulf, it was omitted in subsequent maps, and the Sea of Aral was delineated in the compact form with which we are familiar. The recent surveys of Colonel Koslofsky have shown that this gulf was not a purely arbitrary addition of cartographers by revealing the existence of a lake of fresh water to the north of the Sari-kamish depression, which, it seems reasonable to suppose, was at one time in communication with the Sea of Aral. It is always filled with water, whereas the Sari-kamish hollow, though occasionally filled by the overflowing of the Oxus, has been dry for ages, except in the lowest part, where two small lakelets are always to be found. Aïbu-Ghir must have been separated from the Sea of Aral many centuries ago, for it is no doubt this lake which Jenkinson reached in 1558, twenty days after leaving the Gulf of the Tsarevitch, and even then its waters were sweet and fit for drinking. It is still an open question how its separation from the sea was brought about, whether by subterranean disturbances, or by the action of the river Oxus. It is supplied with fresh water by a stream which drains marshes fed by the Oxus. As however, the lake has no outlet, the fact of its remaining fresh requires some explanation. M. Éd. Blanc refers to the Caspian, the salinity of which is decreasing. Here the largest amount of evaporation takes place in land-locked lagoons, where the salt left behind by evaporation forms beds instead of being diffused through the remaining volume of water. Some such process may have reduced the salinity of the Aïbu Ghir, but it is hard to believe that the water has thereby been rendered quite fresh and kept in that state.

The Indian Census.—This census was taken on February 26th by nearly a million of enumerators. The population was found to be nearly 286 millions, of whom 220½ millions live in British territory, and 65½ millions under feudatory governments. The increase during the past decade has been 26 millions, or 29 millions if newly acquired districts be included. The density of population is 474 to a square mile in Bengal, 442 in the North-Western Provinces, and 248 in Madras. In Sind the growth of population has been very marked, amounting during the decade to 18¾ per cent. Burma has also made rapid progress, owing to the abundance of land ready for new settlers. The increase of population is 22¾ per cent., and Lower Burma is now as densely peopled as Portugal. As regards the towns, Calcutta now stands first and Bombay second, but changes in town areas and errors in the preliminary report render it impossible to give an accurate comparison of urban populations at present.—*The Times*, 18th May 1891.

Further India.—The general staff of the French army of occupation is engaged in the construction of a map of the French possessions. The scale chosen is

1 : 200,000, and the whole work will consist of 40 sheets, 12 for Tong-king 13 for Annam, and 15 for Cochin China and Cambodia. At the same time a reduced map on the scale 1 : 500,000 will be produced, comprising 16 sheets, and a general map on the scale 1 : 1,000,000. To avoid trouble and delay the sheets are printed in Indo-China, and are therefore not artistically on a par with European maps. The map of Tong-king on the reduced scale is now ready, and contains much that is new. The frontier towards China is delineated so far as it has been definitely fixed by treaties. Towards Siam the boundary is quite indefinite, and is, therefore, not shown in the map.—*Petermann's Mitt.*, No. 4, 1891.

The Population of Japan.—The *Chamber of Commerce Journal*, May 11th, states that at the commencement of 1889 the total population of Japan amounted to 39,607,234 persons, 20,008,445 being males, and 19,598,789 females. The increase over the population of the preceding year was 537,543, but from this number must be deducted the 117,648 persons omitted in the former census. The average density for the whole empire is 401 to a square miles. The district of Tokio is the most thickly populated, the number of inhabitants to the square mile being 536, while Yezo has only 1·1 to the same area. The town of Tokio contained 1,313,299 inhabitants on January 1st, 1889. Then follow, in order of size, Osaka, Kioto, Nagoya, and Yokohama, the last having 119,783 inhabitants.

AFRICA.

Great Britain and Portugal in South Africa.—On June 11th the new Anglo-Portuguese Treaty was signed in Lisbon. The principal changes in the frontier therein laid down are as follows :—From the mouth of the river Ruo the boundary will follow the mid-channel of the Shiré southwards to a point a little below Shiwanga. Thence the northern limit of the Portuguese territory will run due westwards till it meets the watershed between the Zambesi and the Shiré, and will follow this watershed and that between the former river and Lake Nyassa up to the parallel of 14° S. lat., where it will turn to the south-west, and continue in that direction to the intersection of the 15th parallel with the river Loangwa. It will then follow the mid-channel of this river to the Zambesi, and then run due south to the 16th parallel. From the Mazoe (Mudzi ?) river it will follow the meridian of 33° E. long. southwards, as laid down in the draft of the abortive treaty of August 20th, but only as far as 18° 30′ S. lat. Thence it will follow the upper part of the eastern slope of the Manica plateau to the main channel of the river Sabi, along which it will run to the confluence of the Lunde, and then in a straight line to the north-eastern point of the South African Republic. In the delimitation of the frontier along the skirt of the Manica plateau it is understood that the Portuguese territory shall in no case extend to the westward of 32° 30′ E. long., or the British territory beyond the 33d meridian eastward, but the line may be deflected, if necessary, so as to leave Mutassa in British, and Massi-Kesse in Portuguese, territory.

Great Britain undertakes to make no objection to the extension of the Portuguese sphere of influence from Delagoa Bay southwards as far as a line drawn from the confluence of the Maputa and Pongola along the parallel to the coast.

On the west the British frontier will follow the Zambesi from the Katima rapids to the territory of the Barotse kingdom. That territory will remain within the British sphere, and its western boundary will be determined by an Anglo-Portuguese Commission.

The transit of goods across Portuguese territory shall not, for a period of eighty years, be subject to a duty exceeding 3 per cent., and Her Majesty's Government

shall have the option, within five years, of commuting the dues for the remainder of the period into an annual payment of £30,000. Goods, however, shall pass free through the districts adjoining the Zambesi above the confluence of the Shiré on the left, and of the Ruenya on the right, bank. The navigation of the Zambesi and the Shiré and their branches shall be free for the ships of all nations, and the Portuguese Government undertakes to facilitate the traffic on the Pungwe, the Busi, the Limpopo, and the Sabi. The Portuguese are also bound to construct a railway between the British territory and Pungwe Bay and to carry a road from the highest navigable point of the Pungwe River to the frontier. Telegraphic communication with the coast is also to be established. Notes are to be exchanged with regard to leases to be granted to merchants and others of sites for warehouses, etc., railway rates, and the prohibition of the importation of ardent spirits.

British Protectorate over Nyassaland.—The following announcement is taken from the *London Gazette*:—

"*Foreign Office, May* 14, 1891.—It is hereby notified for public information that, under and by virtue of agreements with the native chiefs, and by other lawful means, the territories in Africa, hereinafter referred to as the Nyassaland districts, are under the protectorate of Her Majesty the Queen.

"The British Protectorate of the Nyassaland districts comprises the territories bounded on the east and south by the Portuguese dominions, and to the west by a frontier which, starting on the south from the point where the boundary of the Portuguese dominions is intersected by the boundary of the Conventional Free Trade Zone, defined in the 1st article of the Berlin Act, follows that line northwards to the point where it meets the line of the Geographical Congo Basin, defined in the same article, and thence follows the latter line to the point where it touches the boundary between the British and German spheres, defined in the second paragraph of the 1st article of the Agreement of the 1st July 1890.

"Measures are in course of preparation for the administration of justice and the maintenance of peace and good order in the Nyassaland districts."

The Mobangi and Lake Tsad.—M. Paul Crampel ascended the Mobangi last autumn, making treaties as he went with the chiefs on the French bank. The observations made by M. Lauzière, an engineer who accompanied the expedition, confirm those of M. le Marinel (*S. G. M.*, vol. vii., p. 210), and show that the river extends northwards to about 5° 11′. The natives of the upper Mobangi are very numerous, and possess large quantities of ivory and caoutchouc. M. Crampel established a camp at Dukua-Mossua, and then set out towards Lake Tsad. In February, if all went well, he would arrive at Baghirmi.—*Compte Rendu* of the Soc. de Géog., No. 6, 1891.

AUSTRALASIA.

Hampton Plains, South-west Australia.—These plains, which lie to the north-east of Lake Lefroy, were first visited in 1864 by Mr. Hunt, and in 1888 Mr. George Simpson, M.E., made a journey to them on behalf of a syndicate of English capitalists, who were desirous of constructing a railway from Esperance Bay to a large area of land leased by them in that region. In December of the same year Mr. Simpson gave a description of the country in a paper read before the Victorian Branch of the Royal Geographical Society of Australasia (*Transactions*, vol. viii. pt. 2). Starting from York, he travelled eastwards for 300 miles over a sandy plain, from which rise at intervals of 6 to 20 miles granite hills, all, except Mount Stirling and one or two others, of low elevation. A creek 22 miles from York was

the only one crossed, and the party had to depend for water on a few wells sunk along the track. At 200 miles from York are two new gold-fields, which promise to be rich in ore, but the want of sufficient capital and water is likely to hinder their development for the present. The plains are covered with stunted scrub, and there is a remarkable absence of flowers so often found on the sandy plains of Australia. Occasionally patches of grass and salt-bush were met with, and a large climbing plant (*Marsdenia Leichhardti*) was noticed once or twice. Several dry lake beds were passed, which seemed at some remote period to have formed the channel of a river. The Hampton Plains are not true plains, but undulating lands, forming large flats and low hills 20 to 100 feet in height. The soil is a rich red loam of volcanic origin, having a depth, as may be seen on the sides of creeks and gullies, of 5 to 15 feet. The rocks are chiefly of eruptive origin. Mr. Simpson believes that the geological formation is the same as at Ballarat and Bendigo, and he found indications of rich deposits of gold, both in alluvial soil and in quartz reefs. Most of the hills are well clothed with grass suitable for stock and salt-bush. Among the timber-trees are various kinds of gum, *Casuarina*, the ordnance tree (*Codonocarpus cotonifolius*), so called because the leaves resemble the *broad arrow*, and a pretty variety of cypress suitable for fencing. Sandalwood is very abundant, as also a variety of the same tree called the *Quondong*, the fruit of which is eaten, sometimes made into jam. Raspberry-jam wood was also found. It yields a beautiful and durable timber, and its seeds are made into bread by the natives. The wood, when freshly broken, gives off a scent resembling that of raspberry jam. Fresh soft water was found in several creeks, water-holes, and native wells, and in several gullies large deep piles of driftwood showed that heavy rains must at times descend over the country. Animals are scarce. Kangaroos live only on the hills; emus and wild turkeys are more numerous, and Mr. Simpson found nests of the Australian pheasant. On the lakes swam a few ducks and other water-birds. Singing birds, on the other hand, are remarkably plentiful. The party met with eleven natives on the plains. Their colour was brownish black. They wore no clothing, and carried no weapon or implement of any kind. It seems, however, that, though generally peaceful, they do occasionally fight, for some spears, boomerangs, and a shield were found concealed under a log. The natives live almost entirely on the large white grubs that attack the jam trees. They also roast the fruit of a climbing plant something like a gourd, and sometimes eat the fruit of the *Quondong*. They sleep on the open ground, keeping themselves warm by fires. In their appearance there is nothing repulsive, and, though living in such a barbarous fashion, they show no lack of intelligence. Mr. Simpson was particularly struck with the accuracy with which they repeated any word spoken to them, even imitating the Scotch accent and Irish brogue to perfection.

GENERAL.

The Meteorological Results of the "Challenger" Expedition.—Seeing that water covers nearly three-fourths of the surface of the globe, and exercises an important influence on the temperature of the air above it, and, by the intervention of winds, extends that influence over the land surfaces, it was impossible to give a satisfactory account of the meteorology of the earth in the absence of records of a complete series of observations taken in the open ocean. It was, therefore, of the utmost importance that the records of the *Challenger* Expedition should be thoroughly digested, and this work Dr. Buchan, after seven years' labour, brought to a

conclusion rather more than a year ago. In addition to the results of the *Challenger* observations, he also made use of records of temperature, atmospheric pressure, etc., received from a large number of stations in all parts of the world. Some of the most striking points in the report are given in an address to the Royal Geographical Society, published in the *Proceedings* for March and accompanied by four maps, of which two show the distribution of temperature and atmospheric pressure, respectively, for the month of January, and the other two the same phenomena for July. These are reproductions of some of the fifty-two maps annexed to the report.

One important fact that the *Challenger* observations revealed is, that the daily variation of the temperature on the surface of the ocean away from land is very small, nowhere exceeding a degree between lat. 40 N. and 40 S., and falling to one-fifth of a degree in high latitudes. The temperature of the air was found to have a range about three to four times as great as that of the water below. In the Southern Ocean, at about lat. 63°, it was 0°·8 inches, or four times as great as that of the sea in the same region. Over the open sea the humidity curve closely follows that of the temperature, falling to a minimum at four o'clock in the morning and rising to a maximum at two in the afternoon. But near land a second minimum occurs from about 10 A.M. to 2 P.M. At this time, the land being heated, a current rushes in from the sea to take the place of the hot air that rises from it, and dry air from the upper regions of the atmosphere descends over the ocean. Over the open sea the barometer, though removed from the disturbing influence of land, shows as marked oscillations as over land where the diurnal variation of temperature is great. The cause must be sought in the daily changes in the temperature and humidity of the air produced through all its height by solar and terrestrial radiation. Another important fact is that, latitude for latitude, the amplitude of the barometric oscillations is larger in an atmosphere highly charged with aqueous vapour than in a dry one. In the anticyclonic regions of the Atlantic and Pacific, the barometer falls only about 0·025 inches from the morning maximum to the afternoon minimum. Since pressure remains high, though currents of air are constantly flowing out from these regions in all directions over the surface of the ocean, it follows that the dry air from above must descend into their centres. These anticyclonic regions play a most important part in regulating the climates of the neighbouring continents. The four principal lie in the Atlantic and Pacific, at about lat. 36° N. and S., and appear in all the monthly charts, with the exception of the North Atlantic region, which is absent in the month of January only. The absolutely highest mean pressure for any month, about 30·5 inches, is to be found in Central Asia in the month of January. Here, to the south of Lake Baikal, is the centre of a great anticyclone, covering a large part of Eurasia, from which south and south-west winds blow over Russia and Western Siberia, raising the temperature of these countries. Their effect may be seen on the temperature chart, on which the isothermals run nearly north and south. Another example of the effect of pressure on climate may be taken from the low-pressure system in the North Atlantic, where the lowest mean pressure of 29·5 inches occurs between Iceland and the south of Greenland. This system gives rise in winter to south-westerly winds in Western Europe, and north-westerly over North America. While, therefore, the temperature of the former is abnormally raised by winds from lower latitudes, that of the latter is lowered by cold breezes from the Arctic regions. Hence, the temperature of coast of Labrador is only −13°, while on the same parallel in Mid-Atlantic it is 45°, or 58° higher. The influence of other cyclonic and anticyclonic areas is discussed in Dr. Buchan's article. In reference to the drawing of isobars, the author gives a warning against

the use of observations in steep and confined valleys, where descending cold currents at night and ascending warm currents in the afternoon unduly raise and depress the barometer alternately. Thus, in the Valley of Tönset, in Norway, the mean is 29·95 inches, while at Dovrè, situated at about the same elevation but separated from Tönset by a broad range of mountains, it is 29·87 inches.

Lastly, a few figures must be quoted regarding the velocity of the wind. This the *Challenger* observations showed to be greater over the open sea than near land, the mean difference being from four to five miles per hour. It is greatest over the Southern Ocean (23 miles per hour) and least over the North Pacific (15 miles). The curves on the open sea show a very slight diurnal variation, but near land they exhibit a distinct minimum between 2 and 4 A.M. and a maximum from noon to 4 P.M. The difference between the velocities on sea and land is greatest at 4 A.M., and gradually falls to a minimum at 2 P.M., demonstrating the effect of the land in reducing the velocity by friction and the fact that this effect is, in some way or other, partially counteracted by the heating of the surface of the land. Such are a few of the important results pointed out in Dr. Buchan's paper, which is so full of valuable information that no abstract can do it justice.

The Mean Heights of Continents.—Many calculations have been made of the areas of continents and oceans and their mean heights and depths, respectively. Within the last ten years De Lapparent, Murray, Penck, Supan, and Tillo have devoted much time and care to the working out of tables of mean heights. De Lapparent's results, however, though they exhibit no striking divergence when compared with the others, cannot be relied on, owing to his arbitrary assumption of mean heights for the zones bounded by his contour lines, while Penck's and Supan's tables are deduced from Murray's data, and Tillo made his planimetric measurements on the maps prepared for Dr. Murray by Mr. J. G. Bartholomew. A new and independent solution of the problem is, therefore, desirable, and Dr. Heiderich's treatise, in Dr. Penck's *Geographische Abhandlungen*, bd. v., heft 1, merits the attention of all who take an interest in the problem. Dr. Heiderich has not only collected his own materials, but has calculated his areas and mean heights by a new method, namely, by the use of Simpson's formula. He ascertains, first of all, the extension of the land along the equator and along parallels of latitude at intervals of five degrees, leaving out the almost unknown areas to the north of 80° N. latitude and to the south of 70° S. latitude. To calculate the volumes of land above the sea-level Dr. Heiderich has drawn sections along each of the above-mentioned parallels, of which reduced copies are annexed to the pamphlet. The area of each section is calculated, and three adjacent ones are combined to find the volume by Simpson's formula. It is interesting to consider what probability of error is involved in the use of this formula If y_1, y_2, and y_3 be the lengths of three parallel lines drawn at equal intervals across any surface, its area is $\frac{h}{3} \times (y_1 \times 4y_2 + y_3)$, where h is the distance between the lines. But the result is exact only when $y = a + bx + cx^2 + dx^3$, that is, when y_1, y_2, and y_3 are equal to ordinates of one of the straight lines and parabolic curves represented by the equation. The accuracy of the area given by the formula will, then, depend on the position of the central ordinate. Should it happen to terminate in a gulf or peninsula, the area will probably be too small in the first case and too large in the second. As, however, peninsulas and gulfs usually run north and south, and the vagaries of the coast-line between ordinates 5° apart will be small compared to the longitudinal extension of the land, it is not surprising that Dr. Heiderich's calculation of the land area between 80° N. and 70° S. latitude is only one-twentieth per cent. in excess of Dr. Wagner's, which was obtained by the planimeter. In individual

continents the errors are likely to be greater, and there is a smaller probability of their counterbalancing one another. Dr. Heiderich has already made a planimetric calculation of the area and mean height of Africa, and he compares the results. Among the errors of his present method he points out that this continent maintains a considerable width to the south of 30° S. latitude, and approaches close to the 35th parallel without reaching it. Consequently the area of the zone between the parallels 30° and 40° is only 94 square miles as given by the formula, whereas the planimeter gives 181 square miles. There is a still greater probability of error in the calculation of the vertical sections; and here again Dr. Heiderich points out a failure of a similar kind to that just explained. There is no section passing through the highlands of Abyssinia. The net result of these and other errors is that he obtains 1975 feet for the mean elevation of Africa instead of the 2198 feet given by the planimetric measurement.

Dr. Heiderich's mean heights are as follows:—

Europe	1230
Asia	3018
Africa	1975
Australia	1542
North America	2722
South America	2493
The New World	2640
The United Continents	2440

The first point that strikes one is the great elevation of Europe, which Dr. Heiderich attributes to his having included Iceland, Spitzbergen, Novaia Zemlia, and Trans-Caucasia. His height, however, exceeds Dr. Murray's by 291 feet, and Tillo's by 190 feet, and a rough calculation shows that a layer 190 feet deep over Europe, Trans-Caucasia, and the islands mentioned would raise the average height of the latter to about 5900 feet, while, if Dr. Murray's figures be taken, the average height would be over 7500 feet. Now, the loftiest of the islands, Novaia Zemlia, has a mean height of only 2130 feet, and, lofty as Trans-Caucasia may be, it can hardly supply these deficiencies. We must, therefore conclude that Dr. Heiderich's estimate for Europe is considerably in excess even of Tillo's. Very high figures are also given for North America and Australia (including New Guinea), and though the explorations of Nansen and Sir W. Macgregor warrant the assumption of greater mean heights for these lands than have been hitherto assigned to them, we are inclined to think that, in the former case at any rate, the height given by Dr. Heiderich is excessive.

Dr. Heiderich has collected a large number of data, and taken considerable trouble in working them out, but, considering the defects he has himself pointed out and the probability of the existence of many others, it would be rash to affirm that his calculations merit greater confidence than those of his predecessors. If Simpson's formula be used, regions where it fails should be carefully searched for, and errors rectified by drawing additional sections, or by some other method. Even then, probably, a more accurate solution of the problem may be expected from increasing the number of contour lines and using the planimeter.

Trade-Routes between the Cape of Good Hope and Australia.—It may be seen by laying a ruler on a gnomonic projection chart that the shortest route between Cape Agulhas and Cape Leeuwin nearly touches the 46th parallel of S. latitude, while between Cape Agulhas and Melbourne it cuts the 57th parallel. But, when the ice in high latitudes and winds are taken into consideration, the choice of the best route becomes more difficult. Captain M. W. Campbell Hepworth, in a paper

read before the Royal Meteorological Society (*Quarterly Journal*, January 1891), discusses this question. Lieutenant Maury advocated the higher parallels, not simply because the distance along them is shorter, but because, in his opinion, the winds and seas south of 40° are more favourable; but many authorities consider that the evidence in support of this opinion is by no means conclusive. Captain Hepworth, however, after inspecting the log-books of several steamers of the Anglo-Australasian line, has decided in favour of a route between the 41st and 42nd parallels during the winter, and between the 45th and 46th in summer. The steady flow of westerly winds in the South Indian Ocean is interrupted, occasionally in summer and frequently in winter, by gales of cyclonic origin, which, east of the 30th meridian, seem to travel on paths south of the 43rd parallel in the latter season, and south of the 46th parallel in the former. Therefore, by keeping somewhat northward of the 42nd parallel in winter, and of the 46th in summer, the navigator would make the utmost use of the strong fair gales which blow on the outskirts of these cyclonic areas, while by adopting a more southern route he might approach too close to the centre of depression, or encounter the adverse winds on the right of the centre. As regards ice, none was seen on thirteen out of fourteen voyages on which the easting was made south of 40° S. latitude, and on many of these the 44th parallel was crossed.

MISCELLANEOUS.

The first section of the **Jaffa and Jerusalem Railway**, namely, up to Er Ramleh, was opened for traffic on 24th May 1891.—*The Times*, May 30.

Dr. Ten Kate has been commissioned by the Amsterdam Geographical Society to explore the smaller **Sunda Islands**. He will visit Sumbawa first, and then proceed to Flores.—*Petermann's Mitt.*, No. 4, 1891.

A **New French Expedition to Lake Tsad** has been equipped. It is under the command of M. Jean Dybowski, a lecturer at the Agricultural College of Grignon. By the end of May it had probably already commenced its march from Loango.—*The Times*, May 23.

Early in May an expedition under Mr. R. E. Peary was to leave New York for the **Arctic Regions**. At Newfoundland the party was to take passage in a sealer to Whale Sound, whence they hoped to reach the northern point of Greenland by land.—*Goldthwaite's Geog. Mag.*, May 1891.

M. Joseph Martin, whose expedition was referred to in vol. vi. p. 49 of this Magazine, has travelled from Pekin through Lan-chow to Su-chow, where he met the brothers Grum Grzhimailo. He had experienced great opposition from the Chinese officials, and was in very bad health.—*Compte Rendu* of the Paris Geog. Soc., No. 5, 1891.

The High Commissioner has proclaimed the Queen's sovereignty over the strips of territory known as the **Bastard's Country**, lying to the west of the crown colony of Bechuanaland. The country extends from the Orange River to the Nosob River, and is bounded on the west by the 20th meridian of E. longitude, the frontier of Namaqualand.

This summer Dr. Joseph von Siemiradski of the University of Lemberg is to lead a **Scientific Expedition to South America**. After examining the lands in South Brazil which are suitable for colonisation, the expedition will cross the Pampas with the object of investigating the geography, geology, and fauna of the basins of the Rio Negro and Rio Colorado as far as Lake Nahuelhuapi and the Chilian frontier.—*Deutsche Rundschau*, Jahr. xiii. No. 6.

The use of **Granite in the United States** has largely increased during late years, and the rock has now assumed an important position among the mineral products of that region. From a report by Mr. R. B. Porter it appears that the value of the granite produced in the United States during the year 1889 was 14,464,095 dollars, as against 5,188,998 dollars in 1880. The four most productive States at present are Massachusetts, Maine, California, and Connecticut, in the order named, but those showing the greatest percentage of increase over the returns for the year 1880 are Minnesota, New York, Delaware, and Georgia.

On May 2d the **Canadian Pacific Express** reached Montreal, having crossed the continent from **Vancouver**, a distance of 2900 miles, in the remarkably short time of 91½ hours. The passengers reached Vancouver by the *Empress of India*, which made the passage from Hong Kong in 514 hours 23 minutes, stops included. The letters brought by this route from Shanghai were thirty-two days in transit to London, and those from Yokohama twenty-five days, and they might have been delivered three days earlier had there been a steamer at New York ready to take them on at once.—Sir G. Baden Powell in *The Times*, 14th May 1891.

We have received the prospectus of the fifth session of **Vacation Art and Science Courses** (of which Professor Patrick Geddes is the moving spirit), to be held in Edinburgh in August next. In the school of Social Science a course of lectures will be given by Professor Geddes, Dr. Ernest Grosse of Freiburg, and Professor A. C. Hadon. In connection with this theoretical course there will be a course of practical studies in Seminar, conducted by Professor Geddes, Mr. A. J. Herbertson, and Mr. A. von Jankovich ; and a course of studies in Studio, directed by Miss M. R. Hill-Burton, and Miss Alice Gray. These theoretical and practical courses will be supplemented by the production of Tableaux Vivants, and by excursions in Edinburgh, and to the Kingdom of Fife, the Clyde, and the Border. In the school of Natural Science there will be a course of General Biology by Professor Geddes and Mr. J. Arthur Thomson ; a course of Zoology, conducted at Granton Marine Station by Mr. Arthur Thomson, assisted by Mr. Norman Wyld and others ; and a course of Botany by Professor Geddes and Mr. R. Turnbull. The general aim of these courses is to substitute demonstrations on the actual objects studied for formal lectures, and at the same time to get rid of the artificial stimulus of examination and competition, and to make education a preparation for life. We wish these courses all success.

NEW BOOKS.

Canada and the Canadian Question. By Goldwin Smith, D.C.L. With Map. London : Macmillan and Co., 1891. Pp. 325. *Price* 8*s.* 6*d.*

The author of this work has so long resided in Canada, and is so well known as a thinker and writer, that importance will naturally attach to his latest publication. He commences by showing that the Dominion of Canada is divided into four widely-separated "blocks," connected only by railways, viz. :—1, The Maritime Provinces (Nova Scotia, New Brunswick, and Prince Edward Island) ; 2, Old Canada (Quebec and Ontario) ; 3, Manitoba and the North-West Provinces ; and 4, British Columbia. He considers that each of these "blocks" has more affinity with the adjoining United States' territory than with the other "blocks," from which it is divided by physical barriers. He then reviews in order the various divisions of Canada, beginning with the "French Province" of Quebec. He tells

us that the Quebec "*habitant* is a French peasant of the Bourbon day." They are ignorant, priest-ridden, yet, owing to early marriages, increasing at a great ratio. If there was not an outflow of this superabundant French population into New England, Quebec would be a second Ireland. He estimates the value of the realised property of the Roman Catholic Church in Quebec at £20,000,000 sterling, while her income is reckoned at £10,000,000. "Great Britain is a foreign country to the French Canadian," and the Pope and the Jesuits are, he says, its true rulers.

Turning to the British Provinces, Mr. Goldwin Smith describes Ontario as "the core of the Confederation." The great industry of Ontario is farming, and her farmers have "to work hard and to bargain hard." Temperate, moral, and honest, these men have laid a sound basis of society. The pervading sentiment is democratic, and even schoolmasters dare not effectually "correct the young citizens"—upon which the author comments "No wonder juvenile crime is on the increase." All but manual professions in Canada are overstocked. Canadian judges are underpaid. Ontario is not a large enough area to support a literary magazine, and journalism labours under the same disadvantage. There is a demand for farm labourers and domestic servants, but there is absolutely no room for more teachers or clerks. House-rent is high, clothes are dear, and a great deal of fuel is required. From British, as from French, Canada there is a constant flow of emigration to the richer country of the United States.

Mr. Goldwin Smith then reviews the history of French Canada, before and after the conquest, of Upper Canada and the United Provinces; and then discusses the Federal Constitution and the fruits of Confederation. He concludes with the special feature of the volume, viz.: a detailed account of the "Canadian Question," looking at it from the five aspects of (1) Dependence, (2) Independence, (3) Imperial Federation, (4) Political Union, and (5) Commercial Union. He maintains that no Canadian or American "has ever proposed that Canada should change her political relations to the mother-country without the mother-country's assent." He begs all who approach the "Canadian Question" first of all to clear their minds of the "confusion between a colony and a dependency." Another fallacy to be shunned is that of "treating the Empire in the lump, assuming a vital connection between all its parts, and taking it for granted that the destiny of all of them is the same." A country governed like India has nothing in common with self-governed colonies such as Canada or Australia. Of dominion over Canada, he says, "barely a rag remains to the mother-country, and even that remnant is grudged, and is being constantly nibbled away." He does not see what good Britain gets by owning Canada, whereas he perceives much danger in time of war. Again, he asserts that the feeling of dependency in Canada detracts from the public spirit and pride of country of her citizens. Further, he maintains that British statesmen have, for the sake of peace with the United States, sacrificed to the States large portions of the continent which should have belonged to Canada, and that the Canadians have never forgiven this abandonment.

As to Canada asserting its independence and becoming a separate nation, Mr. Goldwin Smith thinks it unlikely, although not impracticable. With regard to Imperial Federation, he complains that its advocates "refuse to tell us their plan." He considers that, in British Canada, "the movement has no apparent strength except what it derives from an alliance with Protectionism," which "repudiates a commercial union of the Empire and insists on maintaining its separate tariff." He believes only in "the moral federation of the whole English-speaking race throughout the world," including of course the United States. He sees no reason why the union of Canada and the United States "should not be as free, as equal, and as honourable as the union of England and Scotland." It would, he asserts,

afford a security for peace, it would raise the value of Canadian property, and it would free the trade of Canada from the evil effects of such legislation as the M'Kinley Act. The Canadian people at large have no antipathy to the Americans; and whilst the latter have no craving for more territory, they would welcome Canada if she wished to join them. The author states that, what the Canadians desire most strongly is "freedom of commercial intercourse with their own continent," and that this is the object of the movement for "Commercial Union," which originated among the farmers of Ontario, and which is opposed by the protected manufacturers of Canada. "The market of her own continent is the natural market of Canada." The coal, timber, fish, and farm-products of Canada would find in the United States abundant purchasers; her vast mineral wealth would be developed by the free inflow of American capital; her towns would grow into cities under the influence of free trade; her declining shipping trade would immensely increase. Even at present, in spite of the M'Kinley Tariff, Canada trades more with the United States than with any other country in the world. Were the whole American continent free to the Canadians, Mr. Goldwin Smith declares that a "burst of industry" would occur in Canada, such as, after the Union, in Scotland; only he does not inform his readers that Scotland had to wait for more than a century after the Union of 1707 ere the Scottish "burst of industry" occurred, and that it was not the Union but the introduction of steam-power which occasioned the "burst" both in Scotland and England.

The best criticism on this remarkably interesting and well-written work has recently been furnished by the Canadians themselves. In the general election which has just taken place throughout the Dominion, the party advocating closer relations with the United States and showing little affection for the mother-country was completely defeated at the polls. It is evident, therefore, that although an Anglo-Canadian like Mr. Goldwin Smith does not believe much in the value of the connection between Canada and Britain, the majority of the Canadians prize it highly, and have resolved that their political fortunes shall still remain linked with those of the mother-country.

The Historical Geography of Asia Minor. By Professor W. M. Ramsay. Supplementary Paper of Royal Geographical Society, vol. iv. London: John Murray, 1890. Pp. vi + 495.

There are in all probability not half-a-dozen critics in Europe who are competent to review this book in a thorough and searching manner. The present reviewer does not pretend to be one of that half-dozen, and therefore contents himself with indicating the nature of the book. It is a work of great and lasting value. Professor Ramsay has bent all his energies to the task of studying the ancient geography of Asia Minor for nearly ten long years. He has read the ancient authorities, Strabo and the rest, until he has them at his fingers' ends. He has spent a great part of the time travelling in the country. He has grappled in a bold and determined spirit with the manifold complexities and difficulties that surround the ancient geography of Asia Minor. He has in fact equipped himself with the best knowledge, and procured for himself the best opportunities that man could do, for carrying out a great work. And he does indeed state that he had proposed to himself a grand scheme of books on the history and geography of the cities of Asia Minor. It is therefore with genuine regret that we read the words of his preface, that "the current of events, which at one time, by no choice of my own, prescribed this work for me and drifted me into a position of unique advantage for it, is now making it more and more difficult for me to continue."

The purport of the present volume is to record the results of Professor Ramsay's investigations for the use of his successors in the same field of study. These results, although, for various reasons which in no way reflect upon Professor Ramsay, they are presented in an unliterary dress, will always possess the greatest value for students of the ancient geography of the lands between Persia and Greece, because they are all the outcome of original work—original study of ancient writers and original exploration and personal travel in the regions dealt with. The book consists of two parts. The first is based upon the conception that the skeletal framework about which the historical geography of Asia Minor grew and gathered was the system of roads. Accordingly, the bulk of Part I. is devoted to a discussion of the routes followed by the principal and minor roads, from the days when the Hittites had the seat of their power at Pteria (Boghaz Keui) in Galatia down to the existing Turkish *régime*. Professor Ramsay's first finished draught of this portion of his work was unfortunately lost whilst in manuscript, and he had to accomplish the irksome and difficult task of re-writing it all from memory. Part II. discusses the historical geography of the several provinces, and for the most part city by city and bishopric by bishopric. This portion of the work is full of learned discussions as to the identity of sites and similar matters. For the future geographer and map-maker it is a veritable mine of invaluable information. Professor Ramsay here makes many permanent contributions to the subject he has laboured at with such zeal, and, it must be added, at such great cost to himself. Some of his conclusions will probably have to be changed or modified as the work of exploring Asia Minor proceeds. And there is still a vast and incalculable amount of work to be done in that direction, in spite of all that has been accomplished by Kiepert, Hirschfeld, Bent, Ramsay, Sterrett, and others. A very complete index forms an indispensable adjunct, and there is a long list of addenda and indexes of ancient authors quoted, of alterations proposed in the text of ancient authorities, and of Greek proper names.

A History of Civilisation in Ancient India, based on Sanscrit Literature. By Romesh Chunder Dutt. In 3 vols. Calcutta: Thacker, Spink and Co.; London: Trübner and Co., 1889.

Sanscrit literature, though of great antiquity and remarkable both for the vastness and variety of its contents, is nevertheless singularly destitute of works of history. The old Indian sages, absorbed in the dreams of their philosophy, which taught them to contemn all external things as delusive unrealities, took but little note of the events passing around them, and left them unrecorded. Hence the earliest portion of Indian history is mainly constructive, and, as might be expected, is dark, dubious, confused, and perplexing. Hence, also, in works which profess to be *histories of India*, the period antecedent to the Mohammedan conquest is dismissed with a curt notice altogether out of proportion to its intrinsic importance. There was accordingly much need for such a work as that before us, which presents a popular exposition of all the main features of Indian history, from the time the Aryans first entered the country till its conquest by the Mohammedans, who took care to have the national transactions thenceforth properly recorded and preserved. The author, who is a Hindu by birth, a barrister-at-law, and a distinguished member of the Indian Civil Service, to which he gained admission by the usual competitive examination, is the master of a good English style, writing the language with as much ease and vigour as if it were his mother-tongue. He is deeply read in Sanscrit lore, and is at the same time conversant with the facts of Indian antiquity which have been brought to light in the course of the last hundred years by the

industrious researches of European as well as of native scholars and archæologists. He therefore entered on the difficult task he proposed to himself with the qualifications most requisite for doing it justice, and no one who reads his volumes can fail to admire the ability and skill with which he has condensed into a clear and very readable narrative the multitudinous and complex array of facts he had necessarily to deal with.

He divides his history, in which he surveys the vicissitudes of the long term of 30 centuries, into five distinct epochs, which he names respectively the Vedic, Epic, Philosophical, Buddhist, and Pauranic. In his treatment of the Philosophical epoch, in which he discusses the rise and progress of Buddhism till the time of its establishment by Asôka as the State religion, he is not so happy as Duncker, who has examined the early condition of India in the fourth volume of his great work on the *History of Antiquity*. The German author, it appears to us, shows a deeper insight into the causes which ensured the eventual success of the great revolt against Brahmanism, and at the same time sets forth these causes with a force and eloquence to the level of which the Hindu author does not rise. His third volume, devoted to the Buddhist and Pauranic epochs, is of peculiar value, since the ground it covers has not, so far as we know, been traversed in its entirety by any other writer. The period, moreover, of which it treats is not only that which is least generally known, but its history is at the same time most obscure and fragmentary and the subject still of many undetermined controversies. It is no small praise to say that he has reduced these chaotic materials to order, and worked them up into an interesting narrative. He holds some views, however, to which we cannot assent. We think, for instance, that it may be taken as certain that Pânini, the great grammarian, lived several centuries later than he would have us believe. He is also certainly in error when he states that the cruel practice of *Suttee* was unknown in India till three or four centuries after Christ. We know, on the contrary, that the Greeks who accompanied Alexander the Great into India, 327-5 B.C., saw widows burned on the funeral piles of their husbands, while Diodorus not only states that the practice was one of great antiquity, but relates the circumstances which led to its introduction. The work will, we trust, find a large circle of readers, both in this country and in India. The copious index with which it is furnished will make it a useful work of reference.

Modern Customs and Ancient Laws of Russia, being the Ilchester Lectures for 1889-90. By MAXIME KOVALEVSKY, ex-Professor of Jurisprudence in the University of Moscow. London : David Nutt, 1891. Pp. x + 260. *Price* 7*s.* 6*d.*

The six lectures contained in this book were delivered at the Taylorian Institution in Oxford. The author belongs to the historical school of jurisprudence, of which our most brilliant champion was Sir Henry Maine, to whom this book is dedicated. The first lecture deals with the marriage customs and usages of the ancient Slav races settled in Russia. The evidence that Professor Kovalevsky cites tends strongly in favour of the matriarchal theory of the family as expounded in the late J. F. M'Lennan's *Primitive Marriage*. Professor Kovalevsky is, however, inclined to see more in the vague and, as he confesses, difficult and obscure words of the old Nestorian chronicler than they perhaps warrant. The second lecture discusses the household community, of which the type best known to us is probably the Servian *Zadruga*. The subject of the third lecture is the village community of old Russia, which "appears to be very like that of mediæval England, with its system of open fields, its hides and virgates. It may be also compared to the German mark, so far as the mark is composed of a set of villages subdivided

into units, partly financial, partly territorial, called *Hufen*, and securing to their private holders, like the English virgates, the right to have a distinct share in the arable fields and in the meadows of the village." In the next lecture Professor Kovalevsky shows how during the Middle Ages Russia was a loose federation of democratic principalities, or rather republics with a prince at their head, in which the *people* enjoyed a considerable share of legislative, executive, and judicial power. That Russia once had parliaments will be a surprise to most English readers; yet such was the case between 1550 and 1698. Not that they were parliaments like the modern Houses of Representatives or Commons, and that they met every year: they were rather analogous, in respect both of constitution and times of meeting, to the French Estates. In the last lecture the history of serfdom in Russia is sketched. The Russian peasant was originally in many respects a free man; serfdom grew up and fastened itself upon him during the course of time. As this brief analysis will indicate, the book possesses great value and interest for students of primitive institutions and the growth of social arrangements, and its value is enhanced by the fact that the materials are drawn from a field unfamiliar to most English scholars.

The Pacific Coast Scenic Tour. By Henry T. Finck. Map and 20 Illustrations. London: Sampson Low, Marston, Searle, and Rivington (Limited), 1891. Pp. xv+309. *Price* 10*s.* 6*d.*

Mr. Finck is an American, who has the good taste to appreciate the grand scenery of his own western coast, and sufficient patriotism to challenge the world for its equal. Further, he urges his countrymen to turn their holiday footsteps away from this second-rate continent of ours, and to save their dollars for a scenic tour, the like of which no other section of the globe can furnish—which is very sensible advice, although Mr. Finck apparently forgets that it is not only natural scenery that Americans visit Europe for. Western cities, even the best of them, are apt to pall on the tourist after a time, while places like Seattle or Vancouver, remarkable only for their phenomenally rapid growth, possess a lively and permanent interest chiefly for those who hold real estate within their borders. To all who have any prospect of making a tour along the Pacific coast of North America, however, Mr. Finck's volume can be unreservedly recommended; and for the benefit of the unlucky majority it may be added that the next best thing to the tour itself is Mr. Finck's description of it. He carries his readers from San Diego to Sitka, with occasional trips inland, as to the Yosemite Valley and up the Columbia River; then across the Canadian Pacific route to Winnipeg and Lake Superior; and finally back to the Yellowstone Park and the Grand Cañon of the Colorado. Many of the places he visits have been described before, but some have not; in any case things change quickly in the Pacific States, and there is a great deal of fresh information in Mr. Finck's work which cannot be got anywhere else. He is a close observer, evidently, and a bright and clever writer; there is not a dull page in the book, which bristles with good stories, some about big fish, others presumably true. There is an index (not to the stories, of course), but it is not very complete.

Aarbog for Dansk Kulturhistorie. Udgiven af Poul Bjerge. Kjöbenhavn, i Kommission hos Lehmann and Stage, 1891. Pp. 190. *Price* 2 *kr.*

The publication of this little year-book is an indication of a tendency we greet with the warmest welcome, no matter in what land it shows itself—the tendency, namely, to study the social and economic conditions of the people as distinct from

the ruling classes, and to write history from that standpoint. We wish Herr Bjerge all success in his enterprise, and hope he will be able to follow up this, the first issue of his year-book, with a long series of succeeding volumes. The *Aarbog* contains five contributions. Of these, two are of particular interest, not only for the historian, but also for the general reader—one, by H. Nutzhorn, giving an account of a long lawsuit between a peasant and the university of Kopenhagen; the other, by Poul Hansen, a description of the condition of the peasantry of Denmark during the second half of the eighteenth century. The former, although it treats of that usually dry subject a lawsuit, is full of dramatic and epic incident—fuller of interest, in fact, than many novels we read. The personal element figures prominently also in the latter paper. Both make the life of the period treated of stand out in a series of pictures before the mind's eye. Both are founded on documentary evidence of the best kind. In another paper H. F. Feilberg tells us, with a wealth of illustration, about the magician Cyprianus, a saint who, amongst the Danish peasantry, occupies a similar position to what Virgil did generally in the Middle Ages, or Dr. Faust more particularly in Germany, or Friar Bacon in England. The editor is responsible for two reports, which give a good deal of information about the state of Danish agriculture in the year 1757. The fifth contribution is of local interest only. Not one of the articles is dull or technical, and each and all can be read with entertainment by the ordinary reader.

Epochs of American History: The Colonies, 1492-1750. By Reuben Gold Thwaites. With Four Maps. London and New York: Longmans, Green and Co., 1891. *Price* 3*s.* 6*d.*

This is the first of a series of American *Epochs*, uniform with the English and the Modern *Epochs* of the same publishers. The editor is Dr. Albert Bushnell Hart, of Cambridge, U.S. This volume, with the two that are to follow, will form a complete new history of the United States. It is written by Mr. R. G. Thwaites, the Secretary of the State Historical Society of Wisconsin, and it is a very thorough and valuable piece of work. At the head of each chapter there is a full list of "references" to authorities for the period to which it relates. These lists form, in fact, a complete bibliography of American history and geography, and will be invaluable to students. One of the most important features of the work is the prominence it gives to geography in its historical relation. This forms in fact the starting-point of the whole narrative, which tells the story of early colonisation and exploration in a methodical and business-like way, and with but little of the glamour of romance or the tinsel of rhetoric. The geographical basis of the history is illustrated in one physical and three political maps—the former excellent, the latter useful, though common-place. We note with some misgiving that, though published in London, the book follows the American style of spelling in such words as "honor," "neighbor," "favor," "labor." Is this a forecast of what the new Copyright Act is to do for the English language?

College History of India: Asiatic and European. By J. Talboys Wheeler, late Assistant-Secretary to the Government of India, Foreign Department, etc., etc. London: Macmillan and Co., 1888.

The author of *The College History of India* is already well known as the author of *A History of India from the Earliest Times* and *A Short History of India*. It is intended to serve as a text-book for students, and it is certainly well adapted for the purpose. It is written in a direct, unadorned style; it is full of facts, and

does not waste much space on descriptions ; and it is suitably furnished with maps, plans, and chronological tables. The comparative chronological table, in which England and India are placed side by side from the earliest times to the fall of the Moghul Empire, is very instructive. The maps are satisfactory, but the physical conditions which have helped to mould the history of India and its peoples might have received greater prominence in the text.

1. *Days Near Rome*, 2 vols. Third Edition. *Price* 18*s.*
2. *Cities of Northern Italy*, 2 vols. New Edition. *Price* 21*s.*
3. *Cities of Central Italy*, 2 vols. *Price* 21*s.*
4. *Florence*, 1 vol. Third Edition. *Price* 3*s.*
5. *Cities of Southern Italy*, 1 vol. *Price* 12*s.* 6*d.*

By Augustus J. C. Hare. London : George Allen.

We have much pleasure in drawing attention to new editions of Mr. Augustus J. C. Hare's series of handbooks to the cities of Italy. To describe them by the hackneyed name of "guidebooks" would be to mislead our readers and to do injustice to the author. Yet they are guidebooks in the truest sense, and of the most thorough kind. Regarding each and all of the great cities of the peninsula they contain a vast amount of valuable and interesting information, conveyed in the most attractive way, for in these handsome volumes the guidebook takes its place as a department of literature. There are examples in every chapter—almost in every page—of the laborious and thorough manner in which Mr. Hare has done his work. He has gone over untrodden ground ; he has penetrated to places difficult of access and never before visited by foreigners ; he has described places never described in print before, or of which previous descriptions are inaccurate and misleading. He has also used his pencil in supplement of his pen ; for most of the illustrations of buildings and scenery are taken from his own sketches made on the spot. Mr. Hare remarks in one of his volumes that only about one in five hundred of the persons who cross the Alps ever sees Italy. The mass of visitors see a little of the outside of it—not much,—and they enjoy a pleasant holiday ; but of the real Italy—its life and character and institutions—they are nearly as ignorant when they leave the country as they were when they entered it. The object of Mr. Hare's volumes is not so much to show these visitors Italy as to show them how Italy may be seen. The single volume on *Florence* is reproduced from the *Central Cities*, but it is not a mere reprint, for it contains a large amount of new matter. It also contains a plan of the city, which is an unspeakable advantage. It is to be regretted that Mr. Hare is not more liberal in this particular. There is not in any of the other seven volumes—not even in *Days near Rome*—a single map or plan. The fault is remediable, and it should be remedied. A good map is often worth pages of description, and it often illuminates the text as a lamp lights up a dark passage, so that you can go forward boldly without groping or stumbling.

Southern France: from the Loire to the Spanish and Italian frontiers, including Corsica. Handbook for Travellers. By Karl Baedeker. With 14 Maps and 17 Plans. Leipzic : Baedeker, 1891. 9 marks.

This volume appears for the first time in English, and it corresponds with the third French edition of the *Midi de la France* and the *Centre de la France.* It is divided into five independent sections : (1) South-western France, to the Pyrenees ; (2) the Pyrenees ; (3) South-eastern France, as far as the Rhone, and Auvergne ;

(4) the French Alps ; and (5) the Cévennes, valley of the Rhone, Provence, and Corsica.

Based on the same principle of arrangement, and accompanied by excellent maps, the present volume compares favourably with others in Baedeker's series of guides. As far as we have tested it, the information has been found to be up to date. For example, we now have a reliable and comprehensive guide to that newly-discovered and interesting region known as the Causses, in which the cañon of the Tarn is the most attractive spot to tourists. With the exception of Mr. Hare's recent volume on *South-western France*, we believe no other English guidebook, properly so called, describes the Causses.

Bemrose's Guide to Paris and its Environs. By Sieverts Drewett. Third Edition : Revised. Maps, Plans, etc. London : Bemrose and Sons, 1890. Pp. 116. *Price* 1*s.* and 1*s.* 6*d.*

For its size and price this is an excellent guide, and may specially be recommended to those about to visit the Continent for the first time, as it contains many hints certain to prove of value to the novice, although to the more experienced traveller they may appear superfluous. The volume is produced in an attractive and handy form, the indistinct illustrations being the least meritorious feature. The map is good.

A Handbook of Florida. By C. L. Norton. London : Longmans, Green and Co. 1891. 49 Maps and Plans. Pp. 380. *Price* 5*s.*

In style this handbook resembles the well-known "Murray," and it will undoubtedly prove of the greatest use to all visitors to Florida. The railway routes, hotel rates, and the usual prices for saddle-horses, carriages, boats, guides, etc., are given. Indeed, the information supplied is all that could be expected in a book of this kind. A paragraph history of Florida, from 1497 to 1889, is given.

The British Empire : Its Geography, Resources, Commerce, Land-Ways, and Water-Ways. By J. M. D. Meiklejohn, M.A., Professor of Education in the University of St. Andrews. London : Simpkin, Marshall, Hamilton, Kent and Co., Limited ; St. Andrews : A. M. Holden, 1891. Pp. 336. *Price* 3*s.*

Professor Meiklejohn's aim is "To present a vivid portraiture of the vast Empire of Great Britain, in such a way as to make it quickly seized by the mind and permanently held by the memory." The system of arrangement and typography is similar to that employed in the *New Geography*, but the present volume is in many ways a distinct advance upon its predecessor. This is in part due to the concentration of attention on the British Empire, but largely to a clearer coördination of geographical facts. A novel and most admirable arrangement consists in grouping the transitory features of each political division in pages by themselves, so that changes in organisation, population, extent and nature of trade may be readily given effect to by annotation. Professor Meiklejohn's work is of high educational value, and the facts are handled with much picturesqueness.

Victorian Year-Book for 1889-90. By H. H. Hayter, C.M.G. In two volumes. Vol. II. Melbourne ; London : Trübner and Co., 1890. Pp. 511, 3 Tables, and Index.

We have previously referred favourably to the first volume of the *Victorian Year-Book* (*see* p. 227), and this volume is as interesting and instructive as the

former one. It contains ample statistics upon crime, exchange, production, social condition and defences, as well as Australian statistics and the tariffs of Australian Colonies. The three tables are valuable as giving a rapid view of the whole subject.

La France et ses Colonies (Géographie et Statistique). Par E. Levasseur. 2 vols. New Edition, entirely revised, 1890. Paris: Libraire Charles Delagrave. Pp. 551 and 685, and Indexes. Numerous Tables and Maps.

The first volume of this work is devoted to the physical and political geography of France, and goes in detail into the subjects of soil, climate, history, politics, population, and administration. The second volume is on economic geography, and deals with agriculture, fisheries, industries, means of transport and commerce. It also contains a chapter dealing with Paris itself and a general *résumé* concerning the provinces and towns. A third volume is shortly to appear, which will conclude the work by giving an account of Algiers, Tunis, and other colonies and protectorates of France. The information in this book is thorough in the extreme, and represents an immense amount of research. It is a pity that the various maps are not of equal excellence with the letterpress. The diagrams, too, though useful, would have been much more satisfactory had they all been drawn on one scale, as it would have been so much easier to compare them. This is especially noticeable in the diagrams referring to imports and exports.

Geological Features of the Transvaal, South Africa. By Charles J. Alford, F.G.S. London: Stanford, 1891. Pp. 69.

South Africa is, on account of its mineral wealth, attracting so much attention that an authoritative geological treatise is much wanted. Unfortunately no topographical survey of the Transvaal has yet been made, so, in the useful little work under review, the author only sketches the outlines of the geology and geography of the Transvaal as they have presented themselves to his view during three years of almost continuous travelling in the districts to the north and east of the Vaal River. He gives the rocks of the Transvaal, in descending order, as follows:— 1. Alluvial deposits, sand, peat, recent clays, and drift. 2. Silicious sands and clays, with local beds of coal. 3. Sandstones passing into sandstone quartzites with interbedded quartzose conglomerates, which latter become occasionally auriferous, as in the valuable reefs of the Witwatersrand (White Water's Ridge). 4. Clay mudstones, schists, and shales, with beds of compact quartzite. These quartzites are sometimes auriferous, as in the Sheba mine near Barberton. Trappean rocks and a still older granitic group likewise occur. Mr. Alford maintains that "the port of Delagoa Bay is the natural outlet" for a large portion of the Transvaal, "instead of the steep and difficult tracks over the Drakensberg. The distance from the Murchison Range to the present terminus of the railway at the Portuguese frontier is only about 210 miles. Nothing but railway communication with the coast can ever adequately open up this country; and nothing but opening it up, with drainage and cultivation, will render it healthy and a suitable habitation for Europeans, or one in which mineral deposits, unless of the most exceptional richness, can be worked at payable cost." Several good geological maps accompany this volume.

Studies in Statistics, Social, Political, and Medical. By G. B. Longstaff, M.A., M.B., etc. London: Edward Stanford, 1891. Pp. 442. 30 maps and diagrams and index.

We may say at once that we have nothing but praise for this really admirable

and interesting book, and it will not have been published in vain, if it creates an interest in the vast amount of information which may be obtained from statistics. It is true, as Dr Longstaff remarks, that distrust of statistics is very general, and it is often said "You can prove anything by statistics." Most people forget that without statistics nothing at all can be proved, and certainly in this volume the author, at the expenditure of great labour, has collected a mass of information which will be valuable, not only to the political economist, the physician, and the statistician, but also to the geographer. We shall perhaps best interest our readers and stimulate their curiosity to study the book for themselves if we call attention to some of the contents of the volume, as it will then be seen at once that it appeals to a great number of varied interests.

The first subject considered is the birth, death, and marriage rates of the past fifty years. The mean birth-rate is 33·89 per thousand ; the mean death-rate 21·65; the mean marriage 16·14 per thousand persons living. In the diagram which is given it is at once seen how various epidemics, commercial depression, war, and famine, as well as good and bad harvests, and hence the price of wheat, influence vital statistics. We next find the growth of population and the migrations of people in the nineteenth century dealt with, and it is conclusively shown how the demand for labour in the large centres of population and the consequently higher wages cause a constant migration, "directed from the cottage to the village, from the village to the town, from the town to the city, from agricultural to mining or manufacturing districts." But not only is the countryman attracted to the town by the considerations above indicated, but "life," as represented by the noise and bustle of the street and the glare of the gas-lights, is strangely attractive to him. He forgets that, if there is more *life*, there is also more *disease* and *death* in the densely populated centres of industry. The growth of new nations—the United States, Canada, South America, South Africa, and Australia—is next dealt with in four chapters, and is not only illustrated by an abundance of statistical matter and by maps and diagrams, but attention is called to many an interesting fact causing or retarding national growth. Thus, for instance, in dealing with Canada, Dr. Longstaff writes (p. 126) :—" The adverse circumstances in Canada are mainly three—(1) the climate ; (2) the geographical structure of the country ; (3) the existence of a large population speaking different languages. The climate of Canada has been much abused, but there is no doubt that its severity has also been much exaggerated. As regards health and the enjoyment of life, it has been amply proved to leave little to be desired ; but the compulsory suspension of many kinds of work for several months in each year leads to serious social and economic difficulties, while in Manitoba and the North-West the agricultural season is so short as in many years to make it difficult, in spite of the magnificent weather of the North-Western summer, to get the harvests stored in good condition. I do not say these difficulties are insuperable, but that they are difficulties is undeniable. At the same time, over a large area of the northern states on the other side of the international boundary the same climate holds sway, and has not proved incompatible with a degree of progress that is the wonder of the world."

We have not space to quote more on the subject.

The chapters on the growth of modern cities, the population of London, and migrations are most interesting and suggestive, as also is the chapter on food-supply. Speaking of the enormous increase in the population of London, the author says:—"There is but one remedy that seems at all practicable ; that is, emigration ; only beware of aiding emigration from London itself to any great extent ; if you do so, for every family sent to Canada from Whitechapel or Poplar two families will rush in from Norfolk or Devon, or even Ireland. Some eighty

persons come in from the country to settle in London every day. Stop these people *en route*. Kidnap them and ship them off to the Antipodes. These countrymen will make far better emigrants than townsmen. In other words, do all that can be done to discourage immigration into large towns, and tell Hodge that if he is dissatisfied with his own parish he will do best to cross the seas."

Seven chapters are given to the consideration of medical statistics, with reference to the cause of death, to summer diarrhœa, to various fevers, phthisis, bronchitis, and pneumonia, and hydrophobia. But we must conclude.

This is not a book to be obtained from a circulating library, but ought to find a permanent place upon the shelves of statisticians, philanthropists, medical practitioners and economists.

A Visit to the Summer Home in the Sætersdal and Southern Norway. By ALICE OGILVIE. With an Introduction by R. M. BALLANTYNE. Edinburgh: Macniven and Wallace, 1891. Pp. 104. *Price* 1*s.* 3*d.*

This is a pleasantly written account of a tour in Norway by the author and her friends. If the reader will put it in his pocket and follow in the footsteps of the lady, we can assure him he will see some of the finest "show parts" of the land of fjelds and fjords; though, if he is a gentleman, he cannot expect to repeat the experience of the author of the little book, whom "one bright, blue-eyed peasant youth of seventeen fairly surprised by making an offer of his hand and heart"! There are some characteristic illustrations and a clearly printed map, besides an appendix containing a list of phrases and other useful information.

NEW MAPS.

EUROPE.

ELB-UND EIDERMÜNDUNGEN, Die Marschen zwischen ——, von Dr. R. HANSEN. Massstab, 1 : 275,000. (1) Um 1500; (2) Eingedeichte Marschen um 1750; (3) Eingedeichte Marschen bis 1890.

Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 8. *Gotha: Justus Perthes.*

JULISCHEN ALPEN, Skizzen zur Entwickelung der Wasserscheiden im Gebiet der ——, von Dr. O. GUMPRECHT. (1) Die Julischen Alpen, Schematische Skizzen; (2) Die Wasserscheide von Ratschach, 1 : 40,000; (3) Die Wasserscheide von Saifnitz, 1 : 40,000. *Petermann's Geographische Mitteilungen, Jahrgang* 1891, *Tafel* 7. *Gotha: Justus Perthes.*

MONTE SOMMA AND VESUVIUS, Geological Map of——, with an accompanying Explanation, by H. JOHNSTON-LAVIS, M.D., M.R.C.S., B. ès S., F.G.S., etc. *London: Philip & Son,* 1891. *Pp.* 21. *Price,* £2, 2*s.*

Although many small physical maps and models of Vesuvius, all of them necessarily much generalised, have appeared from time to time, the present publication is the first and only large-scale geological map of the world-renowned volcano. It is on the scale of 1 : 10,000, or 6·33 inches to one mile, and Dr. Johnston-Lavis vouches for the accuracy of the topographical details. The author's long residence in the neighbourhood has afforded him unique opportunities for the study of volcanic phenomena, and the structure of Somma-Vesuvius in particular, and of these opportunities he has fully availed himself. The result is this admirable map, which will be welcome alike to geographers and geologists.

It is in six sheets, and the various products (lava and fragmental materials) of the several phases in the volcanic activity of the mountain are clearly indicated by colours and signs. Thus the ejections from Monte Somma can be distinguished at a glance from those of the younger cone of Vesuvius, while, by means of coloured stippling, the areas covered by *lapilli*, and the degrees of increase in the quantity of loose materials, soils, etc., which conceal or partially conceal the lavas, are indicated. We can well believe that the preparation of this detailed map has occupied much time and labour, and only those who have tried geologising on the slopes of Vesuvius during the hot summer months will fully appreciate the self-denying enthusiasm of the author. We heartily commend the work to all who are interested in the important region which it portrays. The explanation which accompanies the map is short and concise, but sufficient for the purpose.

ASIA.

EASTERN CAUCASUS. Map of the Basadjusi District, Daghestan, illustrating the Travels and Ascents of Mr. G. P. Baker. Scale 1 : 316,800.
Proceedings of the Royal Geographical Society, June 1891.

MINDANAO, Fluss-und Völkerkarte des mittleren Gebiets der Insel ——. Von Professor Dr. Ferd. Blumentritt. Massstab, 1 : 1,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 9. *Gotha: Justus Perthes.*

TIAN-SHAN, NAN-SHAN, AND EASTERN TIBET, Route Map of the Expedition to the ——, of the brothers Grum Grijimailo, to 9th October 1889. Scale, 1 : 2,000,000.
Proceedings of the Royal Geographical Society, April 1891.

TONG-KING AND SOUTHERN CHINA, Part of ——, illustrating the Journey of Mr. A. R. Agassiz. Scale, 1 : 2,534,400.
Proceedings of the Royal Geographical Society, May 1891.

WESTLICHEN KLEINASIEN, Specialkarte vom ——, nach seinen eigenen Reisen und anderen grösseneteils noch unveröffentlichten Routenaufnahmen bearbeitet von H. Kiepert. Massstab, 1 : 250,000. Zweite Lieferung. *Berlin: Dietrich Reimer.*

The first part of this excellent Map of Western Asia Minor, which we noticed favourably in last year's *Magazine*, on page 447, has now been followed, after an interval of several months, by the second part, containing the sheets—Ismid (3), Adramyti (4), Balikesri (5), Alaschehir (8), and Kos (13). Through Aslan Effendi, chief of one of the Topographical Departments in Constantinople, Professor Kiepert obtained access to fresh sources of topographical information, in particular, plans of several new roads which have been constructed in recent years and a map of the vilayet Aïdin (Smyrna), in 1 : 200,000, showing the position of places formerly unknown, as laid down by Turkish officers. The letterpress which accompanies the present part contains—besides the authorities used for this issue—a list of a few additions and corrections for the maps already published, which can easily be inserted by the subscriber. The execution of the maps is in the same superior style as in the first part.

BONIN-UND VOLCANO INSELN—Dr. O. Warburg's Reise nach den Bonin-und Volcano Inseln. Massstab, 1 : 3,750,000.
Verhandlungen der Gesellschaft für Erdkunde zu Berlin, Band xviii., *No.* 425. *Berlin: W. H. Kuhl.*

AFRICA.

SOUTH AFRICA. Itinéraire du Vicomte de Montmort de Kimberley à Soshong, en 1890. *Revue de Géographie, Juin* 1891. *Paris: Ch. Delagrave.*

UGANDA, A Map illustrative of Mr. F. J. Jackson's Expedition to ——, 1889-90. By Ernest Gedge. Scale, 1 : 1,000,000.
Proceedings of the Royal Geographical Society, April 1891.

SOUTH AMERICA.

BRASILIEN, Ethnographische Karte von ——, von Dr. Paul Ehrenreich. Massstab, 1 : 20,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 6.
Gotha: Justus Perthes.

ATLASES.

HISTOIRE ET GÉOGRAPHIE, Atlas Vidal-Lablache, Maître de Conférences de Géographie à l'école normale supérieure. 24 Livraisons, 137 Cartes, 248 Cartons.
Paris: Armand Colin et Cie., Éditeurs.

SCHWEIZ, Topographischer Atlas der ——, im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg. topogr. Bureau gemäss den Directionen von Oberst Siegfried veröffentlicht.

Lieferung xxxvii. :—

No. 200, Menzberg.	No. 340, Combremont.	No. 458, Grandvillard.
„ 204, Malters.	„ 343, Romont.	„ 460, Montbovon.
„ 205, Luzern.	„ 356, Moudon.	„ 465, Montreux.
„ 286, Grandson.	„ 358, Rue.	„ 475, Aigle.

THE SCHOOL HAND ATLAS. A Series of Fifty-four Maps, illustrating Physical, Political, Commercial, and Classical Geography. By J. G. Bartholomew, F.R.G.S.
London, Edinburgh, and New York: T. Nelson and Sons.

THE UNIVERSAL ATLAS, complete in 28 parts, including Index. Published by Cassell & Company, Limited, London, for the Atlas Publishing Company, Limited.

This atlas is an English translation of Dr. R. Andree's Hand Atlas, of which two editions have been sold in Germany. A large number of entirely new maps has been added—for instance, a four-page map of England and Wales, a double-page map of Scotland, maps of Canada, Australia, of the Indian Frontier, and a map showing the trade of the British Empire, which bring the number of pages in the English edition up to 117 instead of 96. Three parts have already been issued, containing a general map of Europe, Egypt, South Africa, a general map of France, Switzerland, Belgium, Holland, Eastern and Western Canada, Spain and Portugal, England and Wales (southern part), and a general map of Italy. All these maps are very well executed, but the map of England and Wales is overcrowded with names and hills, and does not at all compare favourably with the others.

THE SCOTTISH
GEOGRAPHICAL
MAGAZINE.

BRITANNIC CONFEDERATION.

III.—THE COMMERCE OF THE BRITISH EMPIRE.

(With Diagrams.)

By George G. Chisholm, M.A., B.Sc.

It is natural that in any scheme of federation among members of the British Empire the question of closer commercial union should take a prominent place. The importance of commercial interests to the life of any country at once suggests the idea of a Customs Union as an accompaniment of political federation. The idea is likewise supported by historical examples. The federation of the United States brings with it internal free-trade for a population of more than sixty millions over an unbroken area of more than three millions of square miles. In the smaller Swiss Confederation there is the same commercial unity. The European empire which, if not properly a federation, as Professor Freeman tells us, most closely simulates one is nearly conterminous with the German Customs Union. There is a common Customs barrier also for the loose confederation of Austria-Hungary together with Bosnia, Herzegovina, and the principality of Liechtenstein. Internal free-trade likewise holds good in the great federation already existing within the British Empire—the Dominion of Canada; and it is one of the most important articles in the scheme drawn up as the basis of the proposed federation of the Australasian colonies.

A Customs Union for the British Empire is therefore, at least, an aspiration naturally associated with the first suggestion of Britannic Confederation. Whether such a union is practicable is a question for the future. That it is essential to any scheme of confederation few, I

think, would contend. In the case of the British Empire, as pointed out by Sir John Colomb in the first paper of this series, there are undoubtedly great obstacles in the way. Whether these can be met by any practicable tariff arrangement (either in the way of increased freedom or increased restriction of trade) it is fortunately not my business to consider, since the question of Tariffs, as they affect international commerce, falls to be dealt with by another of the contributors to this series. I would only say here that any attempt on the part of the mother-country to bring about closer commercial relations with the self-governing colonies by artificial means, contrary to their real interests, would be a vain endeavour. It would have no permanent tendency to promote federation. If political federation demands any sacrifice on the part of either the mother-country or the colonies, the nature and extent of the sacrifice must be fully understood and fairly recognised on both sides.

In this paper, accordingly, I propose to consider in the briefest manner possible the salient features of the commerce of the principal members of the British Empire as that commerce exists at present,[1] and to draw attention here and there to such indications as seem to me to be afforded of the present tendencies of the commercial development. To a solution of the problem of knitting the Empire together in closer commercial bonds, this is only a small contribution; but such an examination of the actual facts appeared to me the best preparation I could make for the further consideration of the question. In this survey, I have, of course, included India, for, whatever place may be assigned to that dependency in a scheme of Britannic Confederation, its commercial relations must certainly be a matter of the greatest importance.

In Plates I.-III. are three diagrams, which I have drawn up to show the proportion which the trade of the United Kingdom with the colonial and other possessions in the aggregate, as well as with certain groups of these possessions, has borne to the whole trade in each year since 1861. For comparison, I give here the average annual value in millions and decimals of millions of pounds of the total trade of the United Kingdom, under various heads, for the six periods of five years embraced by the thirty years to which the diagrams relate:—

	1861-5.	1866-70.	1871-5.	1876-80.	1881-5.	1886-90.
Imports, . . .	247·6	292·8	360·2	382·5	399·9	389·6
Gross Exports, . .	190·8	234·7	297·7	258·0	295·3	298·5
Exports of British and Irish Produce and Manufactures, .	144·4	187·8	239·5	201·4	232·3	236·3

It must be remembered that these figures do not show the growth in volume of British commerce in the period. The great rise in prices

[1] As, from want of space, many points of interest with regard to the trade of the Empire are here passed over, I should like to take this opportunity of drawing attention to a paper on *Inter-British Trade and its Influence on the Unity of the Empire*, by C. E. Howard Vincent, C.B., M.P., read at a meeting of the Royal Colonial Institute on the 12th of May last, in which details of importance are given concerning the trade of each of the colonies.

of many important commodities about 1872-3, and the great fall in prices subsequently, cause them to be misleading in this respect. The actual growth in volume, even in years in which there was a reduction in value, has been shown in one way by Mr. Giffen,[1] and in another way by Sir Rawson Rawson,[2] who takes the tonnage of ships entering and clearing at British ports as a rough gauge of the volume of the commerce. Unfortunately the mode in which our shipping statistics are collected does not allow this method to afford such precise results from this point of view as the corresponding statistics of Italy, in which the amount of cargo loaded and discharged at each Italian port is entered.

But, notwithstanding the fact that the figures above given represent inadequately the growth in the total volume of British trade, they indicate at least a very large increase in the total trade within the period; and perhaps the most striking thing brought out by the diagrams in Plates I.-III. is, that through all these changes in the actual amount of the trade, the proportion falling to the colonies and other possessions collectively, has varied within small limits. In the total imports, the extreme limits of variation under this head are 21·1 and 34·1 per cent.; the gross exports to the colonies and dependencies were never less than 19·6 per cent., never more than 31·5 per cent.; the exports of British produce and manufactures never lower than 23 per cent., never higher than 36·6 per cent.

These figures of course imply that, throughout, the great bulk of our trade has been with foreign countries, and the aggregate of that trade has varied within limits as narrow. They show what a formidable thing it would be to attempt any serious diversion of that trade. When we consider particulars, the appearance of difficulty in this task is only increased. In losing our exports to the United States, for example, we should lose our best market for linen and jute manufactures and for earthenware, one of our best markets for woollen and worsted tissues, and for mixed silk fabrics, and a market of importance for a multitude of other products. In losing our exports to Germany, we should lose our best market for woollen yarn. Coal, which is estimated to form the cargo of considerably more than two-fifths of the tonnage of vessels clearing with cargoes from the United Kingdom,[3] has a comparatively limited sale in the British Colonies. India and Ceylon are the only two dependencies which take any considerable quantity, and the export to India is not increasing. As regards imports into the United Kingdom, corn and raw cotton are the two principal articles for which increased sources of supply would have to be found in our colonies or dependencies if our trade with foreign countries were restricted in their favour. Already there is a tendency in favour of an increased proportion of wheat and flour being supplied

[1] See *Report to the Secretary of the Board of Trade on Recent Changes in the Prices of Exports and Imports* [C. 5386] 1888.

[2] See the *Sequel to Synopsis of the Tariffs and Trade of the British Empire*, by Sir Rawson W. Rawson, K.C.M.G., C.B., published by the Imperial Federation League; and also each number of the *Journal* of the League.

[3] See Sir Rawson Rawson's corrected estimate in the July number of the *Journal of the Imperial Federation League*.

by members of the Empire,[1] but no such tendency can be detected in the case of cotton.

Before leaving the general consideration of the diagrams in Plates I.-III., we may note that it is as a market for British produce and manufactures that the colonies and dependencies take the most important place in the trade of the United Kingdom. Their share of that commerce is considerably larger than their share in the general exports, and still more in excess of their share in the imports of the United Kingdom.

If, instead of examining the trade returns of the United Kingdom, we study those of the separate colonies and dependencies, we find that the trade with the United Kingdom is to them relatively of much more value than the aggregate of their trade is to us. In nearly every case we find that the United Kingdom takes the first place both in exports and imports, and in many cases the bulk of the trade is with the home country. This is not surprising. The colonies and dependencies may for the most part be classed either as new countries engaged in the development of the agricultural resources of the temperate zone, or countries supplying tropical produce. In either case, Great Britain is in a peculiarly favourable position for supplying their wants and receiving their products. Its wealth in coal and iron, both found in the most favourable situations; its crowded and skilled industrial population, its abundance of easily accessible seaports, all combine to make Great Britain better fitted by nature than any other country for supplying the manufactured articles that new countries and tropical countries require, and hence also for receiving their products, whether in the form of raw materials or articles of food and drink. Moreover, the geographical position of Great Britain and its other advantages for shipping render it peculiarly well adapted for the collection of produce from all parts of the world, to be as widely dis-

[1] Even this tendency is doubtful. It is not borne out by the statistics furnished in our own import tables for the last five years (1886-90) as compared with the previous five. The following figures give the percentage of the total quantity of wheat and flour imported into the United Kingdom from British territory in the four successive periods of five years from 1871 to 1890:—11·0, 14·5, 21·0, 18·3. In spite of the decline in the last period the statement in the text is, however, probably warranted by the considerations subsequently adduced as to the real growth in the exports of wheat from Canada and the probable development of the wheat trade in North America generally (pp. 403-9), and by the fact that railways have not yet done all that may be expected of them in the way of increasing the wheat supply from India. But on the other side one has to note that of late years Australasia has not been able to keep up the amount of its wheat supplies in the British market, whereas Roumania and the Argentine Republic have been rapidly increasing theirs. In any case the above figures show that to make the United Kingdom independent of foreign wheat a new origin would have to be found for four-fifths of the total external supplies. One other fact is, however, worth noting with respect to this branch of our trade. The period 1886-90 was the first of the successive periods of equal length from the middle of the century (and even earlier) in which the aggregate import of wheat and flour was less than in the previous period, as is shown by the following figures giving the average annual imports of wheat and flour in millions and decimals of millions of cwts. in each of the periods from 1851-55 downwards, one cwt. of flour being reckoned as equal to 1¼ cwt. of wheat, as is done in the *Agricultural Returns* of the United Kingdom:—20·11, 23·59, 34·65, 37·27, 50·49, 63·31, 76·78, 75·93. From these figures one may not unreasonably infer that the United Kingdom is one part of British territory that may expect to supply the home market in future years with a greater proportion of wheat.

tributed in other parts—a totally different thing from the merely transit trade which forms a large part of the "general" commerce of countries with a land frontier. The steadiness of this part of British trade is well shown by the following figures, which give the percentage value of the exports of foreign and colonial produce to the total value of British exports for periods of five years:—

Years, . .	1861-5	1866-70	1871-5	1876-80	1881-5	1886-90
Per cent., .	24·4	20·0	19·5	21·5	21·3	20·84

Of the colonies in which the trade with the United Kingdom does not take the leading place, both in imports and exports, the most important is Canada. According to the *Statistical Year-Book for Canada* for 1889, the share of Great Britain and the United States in the trade with the Dominion in four successive quinquennial periods is shown by the following figures:—

Imports into Canada for Home Consumption.

	1868-72. Per cent.	1873-7. Per cent.	1878-82. Per cent.	1883-87. Per cent.
From Great Britain, .	55·46	48·13	44·03	41·25
„ United States, .	35·08	44·24	46·18	45·18

Exports of Canadian Produce.

To Great Britain, . .	37·53	47·68	47·96	46·62
„ United States, . .	51·50	41·31	41·76	44·41

In the year ending 30th June 1889 the proportions were:—Imports from Great Britain, 38·68; from the United States, 46·07 per cent. Exports to Great Britain, 43·12; to the United States, 46·91 per cent.

The magnitude of the Canadian trade makes these figures all the more worth inquiring into. Let us consider, then, the principal articles in which the trade with these two countries is carried on. Among the articles imported in greater quantity from the United States than from elsewhere, are bituminous coal and anthracite, mineral and lubricating oils, raw cotton, maize, wheat flour, hops, meats of all sorts, and other kinds of agricultural produce of the country; raw silk, coffee, and crude rubber, among the produce of foreign countries; copper and copper wire, and, among manufactured articles, agricultural implements, locomotive engines, and some other products of the iron industry, sole leather and boots and shoes, certain varieties of cotton, glass, and paper manufactures, besides others of less importance. Under the head of exports sent chiefly to the United States, we find various products of the lumber industry—that is, wooden articles worked up into such a form as to be ready or nearly ready for use, such as laths, joists, shingles, sleepers, shocks, etc., whereas Canadian forest produce is sent to the United Kingdom more largely in the form of deals and square timber. Then we find among animals chiefly sent to the United States, horses and sheep; amongst other agricultural produce, barley, eggs, potatoes, and hides, horns, and skins other than fur. Among mineral

products, that which is chiefly sent to the United States is coal. Of the products of the fisheries, smoked herrings are principally sent to the United States, dry salted cod and pickled herring mainly to the British West Indies and the United States, fresh salmon to the United States, canned salmon to the United Kingdom, canned lobsters about equally to both countries. Tanning bark—that is, principally the bark of the hemlock pine—is sent mostly to the United States; extract of hemlock bark (for tanning) mostly to the United Kingdom.

Now, in reviewing such lists as the foregoing, taking into consideration the diverse products of the two countries and the mutual relations of their more populous parts, one is disposed to ask with regard to the imports, Where else could they come from? with regard to the exports, Where else could they go to?

A closer examination of the trade between Canada and the United States gives strong support to the contention of Mr. Goldwin Smith that the scattered populations of the Dominion naturally seek to carry on commerce with four different sections of the United States. The maritime provinces of Canada and the States of New England, together with the eastern portions of the States immediately to the south of New England, have an obvious interest in exchanging their products. Ontario and Quebec are naturally anxious to trade with the States adjacent to the parts containing the bulk of their population—that is, with New York, Pennsylvania, Ohio, and Michigan. As regards Manitoba, again, no doubt Great Britain forms, as things now are, the best market for the bulk of its produce; but, on the other hand, it is natural that the province should desire to buy its agricultural implements and supply many of its other wants through the great mercantile agencies of St. Paul. Finally, the Pacific States of the Union are the natural market, almost the sole market of importance, for some of the principal products of British Columbia, and the natural source of supply of some of the chief wants of that province.

To establish these facts by an analysis of the trade between Canada and the United States (so far as the trade-returns of the two countries enable us to make such an analysis) would occupy too much of our space, but a few illustrations of the grounds for Mr. Goldwin Smith's contention may be adduced with advantage. We may notice in the first place that in the case of coal the United States stand first both in supplying this commodity to Canada and in receiving it from Canada. But the coal which Canada receives from the United States, partly in the form of dutiable bituminous coal, partly in the form of duty-free anthracite, is mostly imported into Ontario and Quebec,[1] which are not coal-producing provinces. That which Canada supplies to the United States is mainly sent from British Columbia to California, a State which

[1] All but a small fraction of the bituminous coal is imported into the province of Ontario, Quebec being able to supply itself easily enough from Nova Scotia, and receiving, in certain years at least, more bituminous coal from Great Britain than from the United States, though the import from Great Britain into the Dominion is only a trifling fraction of the whole supply. From the United States, however, Quebec receives large supplies of anthracite, though not as large a quantity as Ontario.

does not produce one-tenth of a ton of coal per head for its own population. The Pacific coast of the United States forms, in fact, the principal market for British Columbian coal, taking at least seven-eighths of the whole production. To withdraw this market accordingly would be to destroy the industry.

Take, again, the petroleum products. Where should we expect Canada to make good the deficiency of her own supplies under this head except in the United States, seeing that one of the two great petroleum-producing regions of the world lies in that country, not far from her own borders and within easy reach of the bulk of her population?

Though both countries are in the main agricultural, they are fitted by nature to supply each other with agricultural products, some of which are most advantageously produced in the one country, others in the other. Confining our attention to the cooler parts of the temperate zone—that is, to the products of Canada and that part of the United States which lies nearest the Canadian border—we find that the United States are able to supply to Canada, for home consumption, enormous quantities of maize and maize (corn) meal, wheat flour, pork, bacon and hams, beef, lard and tallow. Canada, on the other hand, is able to supply to the United States enormous quantities of barley and eggs, and larger quantities of peas, apples, and potatoes, greater numbers of sheep, cattle, and horses. than are imported into Canada from the United States. The Canadian barley is mainly exported from Ontario, which supplies the barley most esteemed in United States breweries. The eggs are sent most largely from the same province and Prince Edward Island; and how much this trade meets the requirements of natural conditions is shown by the fact that in the year ending 30th June 1889, a year in which eggs were admitted duty free into both countries, the export of eggs from Canada to the United States was more than twenty times as great as the import from the United States into Canada.

Now, in the circumstances that are merely illustrated, and by no means fully indicated by these facts, we need not wonder that the trade between the United States and Canada has shown a decided tendency to increase, and even that it has in recent years been increasing at a more rapid rate relatively than the trade with the mother-country. Moreover, this trade, so far as it has been illustrated above, is not one upon which the mother-country can look with any feeling of regret. It is in no way prejudicial to us, and if it were stopped or hindered, we could only deplore the blow thus inflicted on Canada as part of the British Empire. The Canadian coal is not wanted by us, and there is no other part of the Empire that could take it in any great quantity. Australia not only supplies all her own wants in coal, but already takes a share in supplying the market of San Francisco. We are utterly unable to supply our own requirements in mineral oil, and are thus incompetent to make good the deficiencies of Canada. We are glad to take Canadian timber, cheese, butter, and wheat; but now that the exports of barley, eggs, potatoes, etc., from Canada to the United States are struck at by the M'Kinley tariff, the British market will be able to make good to Canada the loss thus caused only to a very limited extent. At present Canada supplies

Great Britain (at least directly) only with the most insignificant fraction of the barley which we import. Potatoes will not bear the cost of a long transit unless they are such as bring an exceptionally high price, and eggs also for the most part seek the nearest available market. Canada perhaps cannot send us too much canned salmon, but if Canadian fresh salmon were shut out of the United States, that would be of no advantage to us, and merely an injury to the people of both the United States and Canada.

We may repeat, then, that the vigorous growth of the trade between Canada and the United States need not be a matter of wonder to anybody, nor of regret on our part. It is no less surprising that the people of Canada should desire to have their trade relations with their great neighbour as intimate as possible.

Moreover, if any forecast as to the future tendencies of commercial development between the two countries may be attempted, it seems to me that the geographical relations between them, and their recent economic history both warrant us in anticipating an increasing need of each other's products on the part of the two countries. Consider first the unparalleled rapidity with which the coal and iron production of the United States has been growing in recent years, in consequence of which the United States production of iron has already overtaken that of the United Kingdom, and its production of coal may be expected likewise to exceed the British production within no long time. Beyond all question this rapid development in the production of the two most useful minerals implies a correspondingly rapid expansion of manufacturing industries generally in the United States. That such an expansion has in fact taken place is indeed notorious, and statistics show that the agricultural industry of the country, or at least that branch of it which is concerned in supplying the chief food-grain of the manufacturing population has not kept pace with this growth. For about ten years the wheat area of the United States has been almost stationary. Though still able to supply all its own population with wheat, and to afford a large surplus for export, the amount of this surplus shows a tendency to diminish. "The truth of the matter is," to use the words of Dr. Longstaff, "that while the railway and the 'self-binder' have been increasing so largely the wheat supply, a vast city population has been growing up in the eastern and middle States, a population as dependent on imports of food as any in Europe." [1] Now whereas, with regard to wheat, the United States show a diminishing exporting power, Canada shows the opposite. While many parts of the world in consequence of the recent rapid fall in the price of wheat have manifested a tendency to contract their area under that crop, Canada contains in the province of Manitoba one of those regions in which an expansion of the wheat area has gone on unchecked.[2] Manitoba and the Canadian North-West generally probably embrace indeed the largest area, at least in the New World, in which wheat cultivation may be extended with success for a considerable time to come—the most

[1] *Studies in Statistics*, p. 188.

[2] The area under wheat in Manitoba increased year by year from 51,000 acres in 1881 to 917,000 acres in 1891.

extensive still-unoccupied area suited for settlement by the vigorous populations of Northern Europe. Since the Dominion came into existence it has passed from the list of countries in which the wheat imports exceed the exports to that in which the wheat exports exceed the imports. In the five years 1870-74 the Dominion imported an excess of wheat and wheat flour amounting in all to $5\frac{1}{4}$ million bushels; in the five years 1885-89 it exported an excess of $14\frac{1}{2}$ million bushels derived from Canadian fields. It is true that only an insignificant proportion of this export is destined for the United States, but if the facts to which attention has just been drawn may be taken to indicate tendencies favoured by natural conditions (which seems actually to be the case), we may reasonably anticipate that in no long time it will be otherwise. We may expect that in the future the manufacturing populations of the north-eastern section of the United States will look to the Canadian North-West for a large part of their wheat supply, just as inevitably as the manufacturing populations of Western Europe. On the other hand the middle provinces of Canada will still find themselves most conveniently supplied with coal, petroleum, and probably many other commodities, by the United States.

Considering, moreover, the enormous undeveloped resources of Canada, both mineral and other, we cannot but admit that if there were free trade with the United States an important and healthy stimulus would be given to the development of these resources, provided that it did not hamper the commerce of the country in other ways; and, keeping that fact in view, we can hardly be surprised that there should be a strong and active party in Canada crying out for reciprocity with the United States at any cost—even at the cost, which at the present juncture would be unavoidable, of discriminating strongly against the products of the mother-country in the Canadian markets. But however natural the cry may be, its wisdom is by no means so certain. The most intimate commercial relations with the United States may be of the utmost advantage to Canada when secured without other disadvantages, but it does not follow that the people of the Dominion would find their advantage in establishing such relations by subjecting themselves, for example, to a tariff that would weigh heavily upon the agricultural population—that is, the majority of the inhabitants of the country—and, moreover, would render all the industries of the country subject to the caprice of a foreign government to a much greater extent than can possibly be the case as long as it remains master of its own fiscal system.

As regards Newfoundland, the only other important North American colony, the great bulk of the export trade of this island has always been with the great Roman Catholic consumers of fish—Portugal and other Mediterranean countries in Europe, Brazil in South America. Frequently, however, the United Kingdom stands first, even under this heading, among the individual countries. In former years it was always first. On the import side the great bulk of the Newfoundland trade is with members of the Empire, principally the United Kingdom and Canada. Under both heads, however, the United States are naturally prominent, especially under that of imports. As a market for fresh fish they would undoubtedly be of much greater importance but for tariff restrictions.

Let us turn now to Australia and New Zealand, the most important of all the colonial groups furnishing (besides minerals) principally products of the temperate zone. Of all our colonies these are the most completely British as regards the composition of their population. At the same time, they are among those whose trade with the mother-country stands relatively highest. In all these colonies the great bulk of the external trade is either with the mother-country or with each other, and if we disregard the merely transit trade between the different colonies, the trade with the United Kingdom constitutes by far the largest share of the whole. So far all seems satisfactory. But if we look at the lines in our export diagram showing the proportion of British exports to these colonies, we notice that after a long period in which these lines show a very encouraging rise, they have at last begun to droop. This may not mean very much. It may only mean that in the last few years the trade with other countries has advanced somewhat more rapidly than that with Australasia. It does not necessarily imply any decline, or even arrest of growth in our Australasian trade. But when we consider the total value of British trade with these colonies, we find that in the aggregate of the five years 1886-90 there has been a decline of 6½ millions sterling in the value of the exports of British produce and manufactures, and that this decline has not been even partially compensated by any increase in the exports from the United Kingdom of foreign and colonial produce, for these show an additional decline of more than half a million. A further examination of this trade with the aid of colonial statistics brings out results even less satisfactory from the British point of view, for we find that while the British trade with these colonies has been declining, the foreign trade with them has been growing. The Australasian imports from the United Kingdom sank from an annual average of £30·71 millions in 1881-5 to £28·78 millions in 1886-9, the Australasian exports to the United Kingdom sank in the same period from an annual average of £25·93 millions to £25·68; but the imports of these colonies from foreign countries rose in the corresponding periods from an average of £5·06 to one of £5·59, their exports to foreign countries from an average of £2·57 to £2·93 millions.

An examination of the trade returns of the individual colonies reveals the fact that in the trade with the United Kingdom a large rise in the imports into Victoria and smaller advances in the imports into Queensland and Western Australia are more than counterbalanced by a decline in the case of the other colonies—above all, New South Wales; and that in the exports to the United Kingdom, both the leading colonies exhibit a decline (Victoria much the greater), whereas New Zealand, Queensland, and Western Australia all show a substantial rise. In the case of Victoria, the principal rise in the imports consisted in metals and machinery, which was, no doubt, connected with another spurt in railway construction and factory building. On the export side New Zealand showed the most noteworthy rise. Fresh mutton, hemp, sheepskins, and wool were all despatched thence to the United Kingdom in increased quantity in the second period, the fresh mutton trade showing special signs of vigorous development.

In the trade with foreign countries we may note particularly the share

belonging to the two leading colonies. Under the head of imports a large rise (averaging nearly £0·7 million per annum) more than makes up for a fall in the case of New South Wales (on the average less than £60,000). Germany, Sweden and Norway, Belgium and France, and the United States all shared in this rise. Under the head of exports a large rise in New South Wales (averaging about £0·33 million) is partly counterbalanced only by a very trifling decline in Victoria. The rise in this case is mainly due to an increased export of wool to Germany, of gold coin, coal, and tin to the United States.

The growth of the trade with Germany is specially worthy of attention. It may be said to date from 1879, when the North German Lloyd's line of steamers began to run between Hamburg and Sydney. Since that year the imports from Germany into New South Wales have increased, in every year except two, from £32,000 to upwards of £500,000 in 1889; the exports to Germany from less than £5000 to about the same value as the imports. In the Victorian trade with Germany the value of the imports advanced between the same dates with even greater steadiness from £16,000 to more than £600,000, that of the exports to Germany from less than £1000 to upwards of £200,000. In both colonies this trade made a great upward bound in 1889, for in the latter part of 1888 it was further stimulated by the establishment of a line of German cargo boats to open up communication between the great wool-exporting cities of Sydney and Melbourne, as well as Adelaide, and the ports of Bremen and Antwerp.

We have already noted that the increased export from New South Wales to Germany consists chiefly of wool, and the rise in this export demands particular consideration. From the peculiar advantages which enormous areas in Australasia possess for the production of excellent wool and for the production of little else, this export may probably be safely regarded as a permanent feature, and a permanent feature of the greatest importance, in Australasian trade. Ten years ago practically the whole of the wool exported from these colonies was sent, in the first instance, to Great Britain (principally to London), but a large portion of it has always been re-exported to foreign countries. For about twenty years, indeed, wool has been the principal article of foreign or colonial origin exported from the United Kingdom, and the rapid rise in the absolute value of this export has till within the last two or three years served to make good the loss in the British re-export trade traceable to the opening of the Suez Canal and other causes. But this trade seems at last to be threatened. Germany is not the only country that now buys wool in increasing quantity direct from Australasia. Antwerp, Havre, and Dunkirk share this trade with Bremen and Hamburg. The total value of wool directly exported to Continental ports increased from £172,000 in 1881 to £1,557,000 in 1888.

This diversion of trade appears to be principally due to causes over which we have no control.[1] We are already in the most favourable

[1] It was, however, one of the most serious aspects of the labour troubles at the London docks two years ago, that they tended to promote a diversion of trade already in progress from other causes.

position for acting as the intermediaries in this trade. The growth of the direct trade with the Continent is likely to stimulate the demand for Australasian wool, and the Australian colonies therefore would probably resent proposals designed to aid the mother-country in retaining this trade by artificial means.[1] The larger the direct trade with the Continent grows, the more likely is it to be carried on with increasing success. London still retains immense advantages as the great wool-market of the world in which wools of all kinds can be sorted, mixed, and graded, and in which accordingly the buyer has the best chance of getting exactly what he wants. But if the direct trade of Australasia with the Continental wool-ports (which already receive the bulk of the Argentine wool) attains such a magnitude as to enable one or more Continental ports to rival London as a wool-market, the growth of that direct will thereby be accelerated. In the meantime we can only console ourselves with the reflection that if we are in the end destined to lose this trade the sooner the change begins, and the more gradually it proceeds, the better will it be for us. Continued growth would in the circumstances supposed only lead to a greater loss. According to an alarmist report copied into the *Board of Trade Journal* for May this year, it was estimated that half the total wool production of the Australian colonies (or at any rate of the colonies of Victoria, New South Wales, and South Australia—it is not clear which is meant), would be sent direct to the Continent this year. A change so sudden would be a disaster to England, or at least to the port of London and the London wool-market. But, occurring at a period when no events took place to interfere with the peaceful development of trade, it would be without a parallel in modern commerce. We may hope therefore that the change will proceed with more gradual steps, so that we may be able to accommodate ourselves to it more easily. So far there is no sign of any change so abrupt and violent in our own trade reports, for the returns for the six months ending June 30th last show a substantial increase in our import of wool from Australia over the corresponding period of the two previous years.

The trade with the Cape Colony and Natal need not detain us long. In recent years it presents some encouraging features. Notably these colonies have of late been growing in relative importance as a market for British produce. In the years 1872 to 1882 we notice the effects of the stimulus given to trade by the working of the Kimberley diamond field, and after a lull we may notice in more recent years the effect of the similar stimulus arising from the working of the Transvaal gold-fields, much of the produce destined for which passes through the Cape or Natal. As stated in the beginning of this paper it is this rapid development of new countries or new regions that Great Britain is peculiarly fitted to promote, and which accordingly is peculiarly fitted to stimulate British trade.

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[1] So far, however, as this change in the course of trade is due not to natural causes but to the artificial stimulus of foreign subsidies, the endeavour to counteract the effects of such a stimulus artificially might not indeed be the wisest course to follow, but at least would not be open to the same objection as an attempt by artificial means to fight against natural tendencies.

Fortunately for us the favourable accounts given of Matabele and Mashona Lands hold out the prospect of a prolonged stimulation of British commerce from the recent settlements in these regions. As, in some cases, however, trade that is really carried on with foreign countries gets entered in our returns as trade with a British colony,[1] so it may happen that much of the trade with these new British settlements may appear in these returns as trade with a foreign country.

Passing over the minor colonies of the temperate zone, let us now turn our attention to the principal tropical colonies and dependencies. The most important group is of course that of the British East Indies, and the most important constituent of that group, India itself. In several respects the external trade of India is highly remarkable. It consists mainly in the exchange of tropical and sub-tropical products of agriculture for manufactured and mineral products of the temperate zone. By certain economists accordingly its external trade would be regarded as the very ideal of commerce. Its export trade in tropical and sub-tropical produce is the largest in the world.

Further, the population of India is the largest in the world whose external trade is regulated on a free-trade basis. The officials who control the government of India being thoroughly imbued with the free-trade ideas which dominate the commercial policy of our own country, have arranged the tariff of India on the same principle. External trade is not exactly free. There is still one article (rice) on which an export duty is levied. But the import tariff is as limited as our own, and is obviously designed for revenue purposes only.

The increase in the amount and value of the external trade of India for many years has also been very remarkable, as is shown by the following figures, which give in millions and decimals of millions of Rx. (tens of rupees) the average value of the sea-borne trade (the great bulk of the whole) for periods of five years ending the 31st of March. The figures relate to merchandise only, including government stores, but excluding coin and bullion:—

	1871-5.	1876-80.	1881-5.	1886-90.
Imports, . .	33·70	39·35	53·06	64·22
Exports, . .	57·02	62·50	82·28	92·68

These figures may be taken as representing fairly well the growth in volume of the trade of India in the period, but owing to the fall in gold prices, including that of silver, which has taken place in the interval, they are not suitable for comparison with the figures given above (p. 402) for the trade of the United Kingdom. I have accordingly calculated the value of the Indian trade in pounds sterling in accordance with the average rate of exchange of the rupee for each year. The results here follow:—

[1] For that reason a line has been introduced into all our diagrams showing the proportion of trade with the British colonies and dependencies, exclusive of that with Hong-Kong, this latter trade being virtually trade with a foreign country.

Indian Sea-borne Commerce.

Average value in millions and decimals of a million £.

	1871-5.	1876-80.	1881-5.	1886-90.
Imports, .	31·68	33·67	43·40	45·58
Exports, .	53·66	53·42	67·30	65·83

These figures may be compared with those for the United Kingdom above referred to, and the comparison shows that in India the advance, on the whole, has been much greater and much better sustained than in our own country—a fact by no means surprising when we consider that within the period in question India added 11,000 miles to her railway system (thus more than trebling its length at the beginning of the period), and that the development of the traffic through the Suez Canal, which affects a much larger proportion of the commerce of India than of that of the United Kingdom, also belongs principally to this period.

Several features of the lines exhibiting the proportion of the commerce with India in the whole trade of the United Kingdom are worthy of particular attention. First, we may note the great rise in the proportion both of imports from India and exports to India, but especially in the former, at the beginning of the period included in our diagrams. This rise belongs to a period in the history of Indian commerce which illustrates in a striking manner the disadvantage of having trade excessively stimulated from temporary causes. The commerce so created is difficult or impossible to retain. The prosperity, or apparent prosperity, thus brought about is invariably followed by a period of adversity, the character of which differs according to circumstances. In some cases it may be a period of long and gradual decline; in others it may come in the form of sudden disaster. In the commerce of India the abnormal rise to which we are now referring was a consequence of the civil war in America, when the supply of raw cotton was so greatly reduced that the cultivation of this crop was entered on with great eagerness in all parts of the world with a suitable climate and a favourable situation for exporting the product. India was the country most powerfully affected by the crisis. Its cotton production was suddenly increased to an enormous extent. During the course of the crisis its exporting power was greatly increased by the completion (in 1863) of the railway from Bombay up the Bhor Ghát, a railway affording a greatly improved outlet for the most productive cotton-growing districts of the Indian table-land. The great rise in the proportion of the imports from India during this period was due not only to the increased amount of Indian cotton exported to this country, but also to the rise in value of the commodity. The prosperity lasted only to the end of the American war. "It led," says Sir William Hunter, "to much wild speculation. The collapse came in 1865. . . . The bubble schemes and financial companies in Bombay city burst one after the other, and brought down in the general ruin the quasi-official Bank of Bombay." In 1865-6 the quantity of raw cotton exported was nearly three-fifths more than in 1864-5, but the total value was about £2,000,000 less. Since 1865-6 the total export of raw cotton from India has only in one year (1871-2) exceeded the amount then exported, and in several years it has sunk below the amount reached before the period of abnormal but temporary prosperity.

Considered from the British point of view, Indian trade is in one respect at least highly satisfactory. India is the most important part of the empire as a market for British produce. Plate III. shows a decline in relative importance in this respect after the abnormal rise in 1863-4, due indirectly to the same cause as the rise in the imports from India just considered; but after 1872 there was, on the whole, a prolonged rise, and a high relative value has been maintained to the last. It must be remembered, moreover, that the diagrams, exhibiting as they do only relative values, do not necessarily imply fluctuations in the total actual value of the trade corresponding with the variations in the lines there drawn. To test whether this is so or not, we must have recourse to the figures showing the actual values, and when this is done the result turns out to be more satisfactory than that which seems to be presented by the diagram now under consideration. Taking from Indian returns the average of the five years ending March 31st, 1890, we find that the total value of the merchandise imported from the United Kingdom in that period was nearly four-fifths (78·5 per cent.) of the total value imported from all countries, a proportion in excess of that of at least the three previous periods of equal length. A further examination of the figures shows, too, that this advance in British commerce with India is not due to any increased export to India of foreign and colonial produce from the United Kingdom. It shows a real growth in the value of the Indian market for British produce.

The Import Diagram, Plate I., conveys the impression of a less satisfactory state of matters from the point of view of the British merchant, and in this case a closer study of the figures confirms, and even strengthens, that impression. In the period of five years ending March 31st, 1875, the value of the exports by sea from British India was about one-half the total value. In each subsequent period of five years there was a considerable decline in this proportion until in the last period (ending March 31st, 1890) the proportion was less than two-fifths (39·4 per cent.). This cannot be regarded as anything else than an inevitable consequence of the opening of the Suez Canal. The tropical and sub-tropical produce of India is of a kind required more or less in all temperate countries. Previously to the opening of the Suez Canal, Great Britain was the one distributing centre for this produce. Since that event it has, however, become less and less so. Much of it is now discharged directly at Mediterranean ports on the route from India to Great Britain by way of that canal. The countries that have thereby principally increased their direct trade with India hitherto are Egypt, Austro-Hungary, Italy, and France. In quite recent years Germany also has greatly increased this branch of its trade. Though the imports from Germany into India still remain small, the exports from India to Germany have increased about sevenfold in the four years 1885-6 to 1886-90—in gold values from about £300,000 to about £2,000,000. Possibly this result also is one of the more indirect consequences of the opening of the Suez Canal. But even though that event has undoubtedly led to the diversion of a certain proportion of Indian and other commerce from British ports, it is to be hoped that no one will jump to the conclusion that it has been, on the whole, injurious to our commerce. It has so greatly increased the

magnitude of international commerce generally that the British gain therefrom has assuredly been greater than its loss.

So much with regard to the countries trading with India. With respect to the commodities in which Indian trade is carried on there are also one or two matters well worthy of attention. We have said that the exports of India consist mainly of tropical and sub-tropical produce. But there are some notable exceptions to this rule. In the first place, there is a large part of India in which the cool season of the year corresponds with the only productive season of certain parts of the temperate zone, and in which, accordingly, the products of that season are not tropical. From this region England has, since the beginning of last decade, derived large quantities of wheat, and for a few years the amount of this export increased so rapidly as to excite the greatest alarm among the agricultural population of this country. There is, in fact, no reason to believe that this export has reached its limit, but the statistics of recent years have shown that at the price to which wheat fell, partly in consequence of this new contribution to the English wheat market, the export from India was not capable of the continuous expansion that was at one time apprehended. Down to 1890 inclusive, the maximum import of Indian wheat into the United Kingdom was that of the year 1885.

Secondly, the export of certain manufactures from India has increased of late years very considerably—in one case with quite remarkable steadiness and rapidity. The export referred to in this case is that of cotton yarn, which is principally sent to China and Japan. It indicates the growth of an industry in direct competition with one of the industries of Lancashire, and the figures showing the severity of this competition are very striking. The export of cotton yarn from British India to the countries mentioned increased year by year, without exception, from somewhat less than 8,000,000 lbs. in the year ending March 31st, 1877, to upwards of 162 million lbs. in the year ending March 31st, 1891. During the same period the amount of the British export of the same commodity to the same destinations varied greatly. It has never reached 48 million lbs., and in recent years it has shown no tendency to increase at all.

Looking to such facts as these, Sir William Hunter has declared that he should not shrink from "the generalisation that the world seemed now to be entering on a new era of competition—the competition between the productive powers of the tropics and of the temperate zone."[1] In the case in question, however, it is doubtful whether the greater productiveness of the tropics is an element in the result at all. The chief factor in favour of India in this commerce appears to be that India not only produces the raw material required for the industry, but also lies much nearer than England to the markets of Eastern Asia. India's main advantage is thus geographical, but not the advantage that it derives from being a tropical instead of a temperate country, except in that the raw material in this case happens to be a tropical or sub-tropical

[1] Paper on the *Industrial Era in India* by Sir William Hunter, K.C.S.I., etc., *Proceed. Royal Colonial Inst.* vol. xix. (1887-8), p. 275.

product.[1] The advantage of India in this case is analogous to that which Scandinavia has for supplying timber products to Western Europe, and Canada for supplying similar products to the United States. The yarn exported by India is only such as can be made with Indian cotton—that is, coarse yarns, or "low counts," as they are called in Lancashire. While India's export of such yarns has been growing, and has thus put a check on the growth of the export of similar yarns of British manufacture, India's own import of cotton yarn from the United Kingdom has gone on increasing, and that on the whole not slowly. But this increase appears to be in yarns of a better quality. Whereas in 1881 the cotton yarn exported from the United Kingdom to India constituted 15·8 per cent. of the quantity and 19·1 per cent. of the value of the total British export of this commodity, it made up in 1890, 19·2 per cent. of the quantity and 25·7 per cent. of the value. The value of this British export to India has thus grown at a greater rate relatively than the amount, from which it would appear that India is now able to buy from the United Kingdom more expensive yarns than formerly—a fact of no little significance when we consider the importance of this commodity in the consumption of the great bulk of the people.

The only other rising export of importance from India coming under the head of manufactured articles is that of leather. Of the enormous quantities of hides and skins which India exports, a steadily increasing proportion leaves the country in the dressed or tanned form. In this case also geographical facts account for the change. For this trade the advantages which India enjoys are similar to those possessed by the United States—abundant supplies of the raw material and the tanning agents, together with a large industrial population.

But though geographical factors, apart from the greater productiveness of the tropics, account in a large measure for the growth of Indian manufactures, this greater productiveness is, nevertheless, a fact of the highest importance commercially. It gives rise in the first place to a much greater variety in the products utilisable in commerce whether in the shape of raw materials or articles of food, etc. The tropics have thus a geographical advantage for a greater number of products than the temperate zone. It leads also to greater cheapness in the production of food even where the population is dense, and hence causes wages to be relatively lower than in the temperate zone. It is only in this way that a tropical situation could tend to give any advantage over other parts of the world in the working of minerals where they happen to exist. But both these advantages would appear to be counterbalanced to a great extent by the diminished energy of the worker in a tropical climate. As regards wages, it was stated in evidence before the committee of inquiry on Bombay and Lancashire cotton-spinning, appointed by the Manchester

[1] No doubt India also derives a certain advantage in carrying on this commerce from the fact that Indian trade with China and Japan is free from the uncertainty attaching to the British commerce with these countries, in consequence of the recent changes in the relative value of gold and silver. It may be noted, however, that the Indian exports here spoken of have increased even more largely in the last two or three years, when the value of silver was rising, than in previous years, when it was falling.

Chamber of Commerce, that relative efficiency being considered, the cost of labour (including the labour of supervision) in Bombay and Lancashire was about equal, and that the wages of Indian operatives increased with their efficiency.[1] We may hope, therefore, that in the future the greater human energy of the temperate zone will be the true correlative of the greater productiveness of the tropics; that the two zones will prove permanently complementary to one another; that, as the products of the tropics are indispensable to the inhabitants of the temperate zone, so certain products of the temperate zone will remain indispensable in the tropics. Sir William Hunter himself points out that India seems, with the growth of her own manufactures, to have an ever-growing fund for the purchase of goods in England, and he anticipates that in the end the development of the industrial era in India will be a gain to Britain in common with the whole world.

Space forbids our entering at any length on the other tropical parts of the empire in the Old World, and to do so would indeed be superfluous for the purpose now in view. The fluctuations in the trade with Ceylon bear witness to the vicissitudes affecting the coffee, tea, cinchona, and other plantations of the colony; those in the trade with the Straits Settlements afford similar evidence as to the fluctuations in the tin industry of the Malay States, and the entrepôt trade of Singapore. Though the trade of Mauritius with the United Kingdom is relatively small, that trade, nevertheless, furnishes a good illustration of the saying, "Trade follows the flag," inasmuch as the great bulk of it is with other British possessions, principally India and Australasia. From the Mauritius India derives annually from 50,000 to 60,000 tons of sugar, or even more, and yet it receives only a trifling quantity of any product from the neighbouring island of Réunion, which is all the more striking since it supplies to both islands the bulk of the rice consumed by the plantation labourers. As regards our new protectorate and "sphere of influence" in East Africa, it would require an entire paper to investigate the prospects of trade there, and it is all the less necessary for me to attempt that here, since it has already been dealt with on several occasions in this magazine.

Our diagrams show the relative importance of our trade with our principal tropical possessions in the New World—the British West Indies and Guiana. It is a trade that has suffered more or less in recent years through the competition of foreign countries, stimulated by sugar-bounties. Till recently the trade with the United Kingdom held the first place the commerce of the principal colonies, but of late years the growth of the export of sugar from many of them and of fresh tropical fruits (principally bananas) from Jamaica to the United States has caused the latter country to rise to the first place among those receiving the exports of Jamaica and Barbados as well as some of the minor islands. This trade is obviously greatly favoured by the geographical conditions, and it can hardly be doubted that it will tend to grow in the future.

[1] See the Report of this Inquiry, paragraphs 529 and 154-61.

HOW MAPS ARE MADE.

By W. B. Blaikie.

(*Read at Meetings of the Society in Edinburgh and Glasgow, April* 1891.)

The subject on which I am deputed to address you to-night is what in the slang of the day may be described as "a very large order." Though the title seems simple enough, the subject itself is so large, and it spreads and ramifies itself through so many arts and sciences, that the temptation to go off from the distinct line of my subject into the different branches that introduce themselves is great, and all these branches are to me so interesting, that I have found great difficulty in confining myself strictly to the story of how a map is made. I have forced myself, however, to stay on the centre line of map-making, and I hope, before the evening is over, to give you a clear and distinct idea of the principles on which a map is made, for the subject of my paper is not "How Maps are Drawn," but "How Maps are Made"; and I will attempt to show you the naked machinery of the process.

I have often been amazed at the popular ignorance of what would seem to be the very first principles of geography and of map-making, and this has induced me to begin at the very A B C of the subject. I intend throughout this paper to avoid technical phrases and mathematical terms. I have nothing new to tell you; much that I am about to say is known to every person here present, and I ask you to bear with me if occasionally I seem childish in my descriptions.

One thing more I should like to premise, and that is, that in this paper I do not propose to go into any great detail, or to confuse any one here with the numberless scientific corrections and modifications that have to be made in all scientific calculations. I will only speak on general principles; those who know the science thoroughly will understand the modifications necessary, while those who have not the same advantage will, I trust, be able to grasp the principles of what is shown.

My intention to-night is to show (1) how a spectator finds his position on the earth's surface; (2) how he defines and records that position; (3) how he makes a map from the information he has found; (4) how he fills up the details of that map; and (5) briefly to describe how the map so made is drawn and printed, and incidentally to show the use of the various tools and instruments employed in these operations.

I assume that we all know that the earth is (roughly speaking) a sphere, spinning round on its axis once in twenty-four hours. Now, if we take up a sphere, like this ball, and mark a spot on it, there is nothing whatever to define its position: no north, no south; nothing to guide us. One point on this sphere is the same as any other point, until we find some reference spot to measure from; but we have assumed that we know that the earth spins round on its axis, and here we at once discover something we can measure from. The ends of the axis of the ball, which we call the poles, are, we see, at rest compared with the rest of the surface of the spinning ball.

Now, this so-called polarity gives us at once two points of reference. Although no one has ever been at either of the Poles, the study of the subject for hundreds of years has proved their existence as surely as if the Poles had been visited and been discovered marked with upstanding posts. Between these two points, which we call the Poles, I can mark a point half-way, which, by spinning the ball in contact with the pencil, I convert into a line—called the Equator, the equal divider—popularly *the* Line. You will observe that this middle line—this Equator—is also the largest possible circle on this sphere, and it is from this circle that all measurements and references North and South are made. We see on the globe and on maps a number of other circles parallel to the Equator to the north and south of it, and drawn at equal distances. These are called the *parallels of Latitude* (or wideness), and they mark certain degrees of *angular divergence* from the Equator.

Consider for a moment what this means. In the first conception of them these lines have no specific distance apart, because they really are angular measurements, and it is this conception of them I wish you to get hold of. A degree of latitude is not necessarily a number of miles, and until we know the actual diameter of the earth we cannot tell what the length of a degree is. It is a proportion of the circumference of a circle—a fractional measurement of it. We may speak of a half, a quarter, of anything, but, until we say what it is a half of or a quarter of, the phrase conveys no idea of magnitude. It might be half a mile, or half a kingdom, or half an inch, or half a crown. Similarly, a degree of a circle means nothing so far as length is concerned, until you know the size of the circle, when you can at once calculate, with the proper mathematical knowledge, the numerical value of a degree at the Earth's circumference.

Now, having marked these lines on the surface of the Earth, we have certain marks on our globe to which we can refer any and every point. It may be said, "Why mark these lines on the map? They do not exist; they are only imaginary." Quite true! But then the first principle of all map-making is to begin with imaginary lines, from which to measure the position of every place on that map; and all such imaginary lines are carefully recorded, as we shall see later on, so that they can be accurately laid down at any moment by those who know how to find them. We find them a great convenience—an absolute necessity indeed—so we leave them drawn on the globe. Imagine a street —any street will do, but for a good analogy imagine a street built, like Moray Place, in a circle. We can say, speaking of, say, a water-plug, or any point in that street, that it is on the centre line of the street, or the line of the lamp-posts, or so many feet to one side of either of these lines. There is no visibly marked centre line or line of lamp-posts, but it can be filled up in a moment by human intelligence, and if there were to be frequent references to them these lines would be marked on a plan for constant use. The parallels of latitude are similar lines drawn for convenience of reference.

The circumference of the Earth, like any other circle, is divisible into 360 degrees, and we number the parallels by the number of degrees of

angular divergence; only, instead of beginning at a pole and going right round, we, for convenience' sake, begin at the Equator and then number 90 degrees towards the North Pole and 90 degrees towards the South Pole.

But one set of reference lines is not enough; we must have another set, and we get them in the *meridians of Longitude*. We draw these through the poles, at right angles to the Equator. They are all "great circles"; that is, each circle is concentric with the globe. The Equator being a circle, we divide it as before into 360 degrees, and the meridians through the points of section form a second system of lines of reference. But, unlike the parallels of latitude, they are all the same size. One is the same as another. How are they to be numbered? Go back for a moment to Moray Place, and remember the lines we drew—the centre of the street, and the line of the lamp-posts. How are we to define a spot on one of these lines? They are circular, and consequently have no beginning and no end. What we should do would be to mark a convenient spot with a flag, or a peg, or a stone, and say—"That is the beginning; measure from that."

This is exactly what we must do in longitude. We must mark a starting line on the earth, and call it Zero; and as all nations have a free choice they have not chosen the same. We have chosen the meridian of Greenwich, the French that of Paris, the Americans Washington, and the Russians Pulkova and the Germans used to use Ferro; but for all English maps, and now for most foreign ones, the meridian of Greenwich is the starting line—the Zero of longitude.

The custom here again is not to reckon 360 degrees round the circle, but to reckon 180 degrees east and 180 degrees west. We saw that latitude was angular divergence from the Equator; but what are these degrees of longitude? Look at a ball spinning round opposite a candle. We assumed a knowledge that the earth spun round its axis in 24 hours. Every part of it comes in turn opposite a heavenly body (say the sun) once in 24 hours, just as every part of this ball comes opposite the candle once in each revolution. Longitude is, then, angular divergence measured by the *difference of time* in coming opposite a heavenly body. As the circle is divisible into 360 degrees, so the day, *i.e.* the revolution of the earth, is divisible into 24 hours, and one hour of longitude is consequently equal to 15 degrees. In maps longitude is marked in degrees, while in almanacs the elements given to reckon it are always written in hours, minutes, and seconds.

Remember, once more, that these degrees are not lengths measured on the surface, but are the record of angular divergence from the initial meridian. It is all the more necessary to bear this in mind because the length on the surface of the Earth of a degree of longitude varies enormously, being greatest at the Equator and nothing at all at the Pole, differing thus from degrees of latitude, which, roughly speaking and for the purposes of this paper, may be considered equal.

The idea that latitude and longtitude are the measures of angular divergence and not absolute distance in miles or yards may be easily grasped by a familiar illustration. If you can imagine two travellers

leaving Italy by road, the one over the St. Gothard pass, and the other over Mt. Cenis, and two other travellers following them by rail at such an interval of time that they are in the railway tunnels at exactly the same moment that the pedestrians attain the summits of the passes: the pedestrian on the mountain and the railway traveller in the tunnel of the St. Gothard pass will be in exactly the same latitude and longitude, and so will the travellers by the Mt. Cenis routes. The pedestrians, however, will be about sixty yards further apart from each other than the railway travellers. The reason of this of course is, that the pedestrians are further away from the Earth's centre, but their angular divergence from the Equator and the Earth's axis are precisely the same, whether they are on the mountain or in the tunnel 5000 feet below.

Now, having defined latitude and longitude and shown how the lines representing them are drawn, we must see how in practice the surveyor finds the latitude and longitude of a place, and thereby begins his map. The Poles, as we saw, are first points to measure from, and the Equator the half-way line. It is evident he cannot measure directly a line from Pole to Pole, find out the half and call it the Equator, and leave pegs at each parallel in passing. He must look to things outside the Earth itself from which to reckon, and he gets such reference-points in the heavenly bodies. To his eye these are situated in the great vault of the heavens. He sees them as if on the surface of a hollow globe continually revolving around him, rising in the east till they reach their highest point above him, called the culminating point, then setting in the west. For thousands of years astronomers have studied these bodies, and fixed their apparent positions in the celestial vault; and these positions are recorded with the utmost possible accuracy in a book compiled by Government, called the *Nautical Almanac*, and from the practical information given there the surveyor finds his position. He may take the sun, or he may take the stars; but the positions of the sun being affected by the motion of the earth round it, I propose to take a star to illustrate my next remarks, as its movements are simpler.

The pole of the heavens is the end of the axis of the earth infinitely prolonged. The intersection of the plane of the Equator with the celestial vault is called the *Equinoctial;* and as the angular divergence on the surface of the Earth is measured in degrees from the Equator and called Latitude, so the angular divergence of a heavenly body from the Equinoctial is called its *Declination*. As the angular divergence from the meridian of Greenwich was called Longitude, so the divergence in time from a starting-point in the heavens is called *Right Ascension*. We had to fix arbitrarily the meridian of Greenwich as a starting-line on the Earth. We have also to fix equally arbitrarily a starting-point in the heavens, and that point may be most simply described as the point in the heavens in which the sun is in spring, when the day and night are equal.

The latitude of any place on the earth's crust is equal to the altitude of the celestial pole. You can see this in a moment if you imagine yourself on the Equator and look to the pole, marked, say, by the Pole Star. You will see it on the horizon and of no altitude at all; and at the Equator you have no latitude, or it is called Zero, but, as you approach the

Pole, the Pole Star will gradually appear to rise higher and higher until when you reach the North Pole it will be directly over your head, and consequently at right angles to, or 90 degrees from, the horizon, and your latitude is then also 90 degrees. But though the Pole Star is very near the North Pole, it does not actually coincide with it, and we must find some other way of finding our latitude accurately. We get this by taking the altitude of any known star in various ways. I will explain the simplest method, of which all others are only slight modifications:—

1. Measure the *meridian altitude* of the star—that is, its highest altitude above the horizon.

2. Deduct that altitude from 90 degrees, which gives its *zenith distance*, or the angular distance from a point exactly over your head.

3. Add (or subtract) the *declination* of the star (found in the *Nautical Almanac*) to the *zenith distance*, and the result is your latitude.

I have here a diagram showing how the latitude of Edinburgh would be found from the bright star Arcturus, which "culminates," or reaches its highest altitude, on our meridian a few minutes before twelve to-night.

I measure first its *altitude*, which I find is 54 degrees. Deducting that from 90 degrees gives its *zenith distance* = 36 degrees; to that I add its *declination*, which I find from the almanac is 20 degrees, and the result is 56 degrees = the latitude of Edinburgh.

Longitude is a more difficult matter, and I have no time to go into it anything like fully. You will find a beautiful description of it in *Herschel's Astronomy*—the best by far of all popular books on the subject. While latitude is absolute, longitude, being difference in time, is relative, for there is no such thing as absolute time; and noon at any place is merely the moment when the sun culminates on the meridian. If the observer has a clock whose going he can depend on, and he sets it to, and keeps it always at, Greenwich time, he knows from that clock or chronometer what time it is at Greenwich when any star comes to the meridian. If, then, he can observe any astronomical phenomenon, such as the meridian passage of a star, he has only to observe the difference of the times recorded on the clock set to Greenwich time and on his local clock, and the difference is the longitude in time. This is the principle on which longitudes are taken at sea, where chronometers can be kept undisturbed, but for explorers on land it is more difficult.

The moon, however, is a natural clock—very complicated, but still readable to the initiated.[1] It is continually moving through the stars, and its angular distance from prominent stars is carefully computed for Greenwich, and recorded in the *Nautical Almanac* for every hour in the year. The observer, then, finding the moon's position by observation, and recording its local time, can find in the *Nautical Almanac* when it had the same position at Greenwich, and the difference of the times is the measure of the longitude.

In old days, when ships met, the first question was, Who are you? the next, What's your longitude? The invention of the chronometer by Harrison 120 years ago has, however, for sailors at least, vastly simplified

[1] The student should read the beautiful explanation of longitude in Herschel's *Astronomy*, § 220 *et seq.*

FIG. 1.—Gores from the Globe.

FIG. 1*a*.

FIG. 2.—The Gores stretched out horizontally to meet in straight vertical lines.

FIG. 2*a*.

FIG. 3.—The map distorted vertically in same proportion as horizontally.

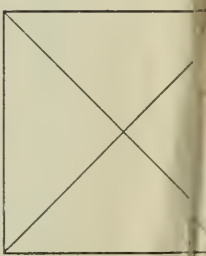

FIG. 3*a*.

Fig. 4.

STEREOGRAPHIC PROJECTION.

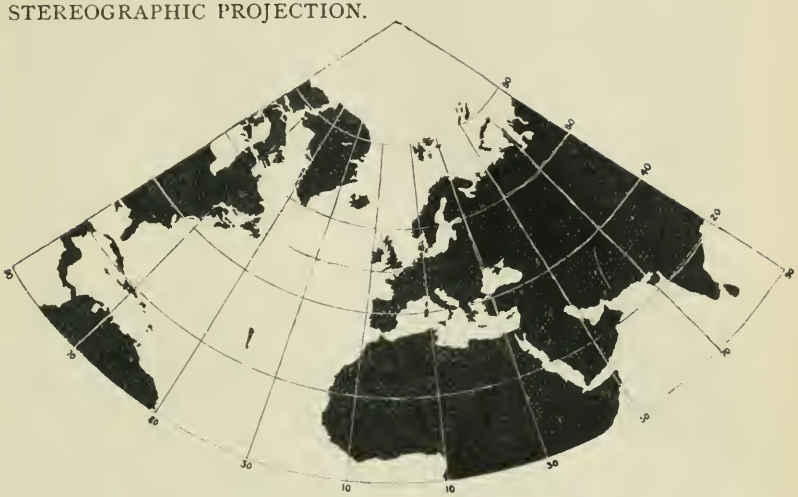

Fig. 5.—CONICAL PROJECTION.

the finding of longitude at sea; and I find from inquiry among sailors, that "lunars" are practically a lost art. In illustration, I may state that I find from the *Nautical Almanac* that Arcturus comes to the meridian of Greenwich at 11.37 to-night. If I have a clock or chronometer marking true Greenwich time, I shall find that this star will come to our meridian at 12 minutes and 40 seconds later; the difference of longitude in time is therefore 12 minutes and 40 seconds, which, converted into angular measurement, is 3 degrees 10½ minutes, the longitude (west) of Edinburgh.

Note here that at stations differing only in latitude the same star comes to the meridian at the same *time*, but at different *altitudes*. At stations differing only in longitude it comes to the meridian at the same *altitude*, but at different *times*. The instrument generally used for taking altitudes is the sextant.[1] At sea, where we have a visible horizon —the line where the sea meets the sky—we measure altitudes from this horizon; but on land we have no true horizon, and then we use, what is more accurate, an *artificial horizon*, which is a cup of mercury in

[1] In reading this paper the sextant, artificial horizon, theodolite, level, plane table, and other instruments were all shown and their uses described. These descriptions are omitted here, and the student is referred for detailed and illustrated descriptions of these and other instruments to Professor Rankine's *Manual of Civil Engineering* (Griffin, Bohn and Co.), or Mr. Usill's *Practical Surveying* (Crosby, Lockwood and Son, 1889).

which the heavenly body is reflected. Measure the angle between the real body in the sky and its reflection in the mercury, and half the angle is the true altitude.

PROJECTION.—Having discovered our position on the surface of the globe, we come to the representation of it on a flat sheet or map.

The Latin dictionary tells us that "mappa" is a sheet or napkin. Now the surface of the globe is curved, and in a map we have only a flat surface to represent it on, and we shall for a short while study how, as it is the basis of all map-drawing. The conventional representation on a flat surface of the curved surface of the Earth is called Projection, because in its fundamental idea it is a picture of the globe projected or thrown forward from the eye on to a flat sheet; but this idea of it is so confusing to the mind unaccustomed to think out such things that, although it is the invariable way of describing it in all text-books, I have preferred to show you three forms of projection without assuming any ideal throwing of the rays on to planes.

The first I show is the modified STEREOGRAPHIC or equi-globular projection (Fig. 4), invented by Philip de la Hire about the end of the seventeenth century. A simple way of investigating this projection is to fit an iron ring over the centre of the globe, and stretch tightly, from the North Pole to the South, indiarubber bands that coincide with the meridians of longitude on the globe, fastening them firmly to the ring at the Poles. Similarly stretch indiarubber bands over the parallels of latitude, fastening them to the iron ring and to the meridians where they cross. While the ring is kept on the globe these indiarubber bands show the parallels and the meridians on the sphere. When the ring is lifted off the globe the indiarubber shrinks to a plane and shows exactly the lines of the stereographic projection. This is the projection used in all atlases for the world in hemispheres, for continents, and for large surfaces. It gives, indeed, a notion of rotundity and a general idea of proportion, but the central portions are shrunk in, and the edges are distorted.

The next projection to be studied is MERCATOR'S. Mercator was a Fleming who lived in the sixteenth century. He was almost an exact contemporary of John Knox. He was a writer on theology and geography. His real name was Gerard Kremer, which name, meaning merchant, he Latinised, in accordance with the custom of the day, into Mercator.

His invention is very clever. The construction of it is a little complicated, and is generally shirked in text-books, but the actual idea is very simple, and I have here designed a piece of apparatus to illustrate exactly what I believe Mercator did when he evolved his system.

Though I have no direct evidence to show how Mercator argued out his system, I have not the least doubt that it was somewhat thus:—

Mercator was a globe-maker, and no doubt worked from the globe. He stripped his gores off the globe, forming a map like this (Fig. 1), which was naturally very inconvenient, owing to the hiatuses between the meridians. He was obliged to join the gores along their meridians (Fig. 2). He then found that he had distorted everything, and the distortion increased in the higher latitudes owing to the gores being further apart towards the top of the map. In order to restore a balance of orientation

(or the relative positions and direction of places), as he had distorted in longitude, so he had exactly in proportion to distort in latitude, as shown in Fig. 3, a complete Mercator's Map of half the Northern Hemisphere, in which you will observe that the parallels are farther and farther apart as the latitude gets higher.

As these gores are not a familiar shape, I have a square here which will catch the eye at once (Fig. 1*a*). I distort it first by pulling it out horizontally as Mercator did in joining the meridians, and it ceases to be a square and the orientation is changed (Fig. 2*a*). I then distort it in height in the same proportion, and it becomes once more a square with the true orientation but larger than the original square (Fig. 3*a*). This is exactly what we did before with the gores of the globe.

Every parallel, in Mercator's Projection, is a straight line, and every meridian is also a straight line. We have, then, an excellent sailing chart; sailors can now find their direction or course by drawing a straight line from point to point. As Sir George Grove puts it very neatly (though he shirks the explanation of the projection), "The most ignorant sailor can lay down his course without calculation. In fact, the invention of this map has been justly called one of the most remarkable and useful events of the sixteenth century; because it enables common, unlearned people to do easily and correctly what only clever, learned people could have done without it."

Mercator's Projection is that used in all nautical charts to this day, because to the sailor it is far more important to know his direction or course than his distance, which with ordinary nautical knowledge, or from nautical tables made for him, he can easily calculate, but he needs to see his course.

In the CONICAL PROJECTION (Fig. 5) we imagine a cone of paper to be rolled round the globe, touching it on the middle line of the map. Near their line of contact the map coincides very nearly with the globe surface, and is fairly accurate; but as it gets further away from the touching point the distortion grows, the places being shown larger than in reality. For comparatively small areas, such as for maps of England or France, it is fairly accurate, and is the projection used in atlases.

In the diagrams on pp. 424, 425, we see the same globe projected on the same scale, but with very different proportions. These three projections are typical ones and the most commonly used, but there are many others. For those desirous of studying the subject the best work on it I know is the article by Mr. Taylor, in the June number of the *Scottish Geographical Magazine* of last year, and to that article I refer them.

MAP-MAKING.—We have now seen how the traveller finds his place on the globe's surface, and how, when found, he can *project* or map that information on a flat sheet. We shall now see how a map will grow. Imagine a ship sailing into unexplored seas and coming to some land, say an island. The navigator at once fixes his position in the ship in latitude and longitude. The navigator's instruments are the sextant, the chronometer, and the mariner's compass. The general idea of the mariner's compass is that it always points to the north; but accurately this is not so. The general direction of the compass, or the Magnetic Pole, is not the true north,

but a spot very considerably to the west of it, and, in fact, shifts continually; not only in different places, but even in the same place, the direction changes from time to time, as there are many local causes of disturbance. The navigator, then, to fix true north, must find his meridian—that is, he must observe the direction of a star or the sun when it culminates or comes to the meridian, and from this observation he computes the amount of the local variation of the compass. In practice it is not the moment of culmination he actually observes, but the statement is accurate enough for the purpose of this popular description. Knowing the variation of the compass, he can then take accurate bearings or directions to any feature he desires to record. Two or more such bearings to (say) a mountain, crossing each other from different known places, fix its position on the map.

The Navigator.—We can now show how a country is mapped. Suppose a ship visits this island, and fixes, by the ways already indicated, a few latitudes and longitudes from meridian altitudes, and sails round it, fixing here and there points on the coast, and perhaps taking bearings of some mountain, then the island would be represented in an atlas with several points fixed and joined by dotted lines. Nautical surveying is always done with the sextant, which measures both vertical angles and horizontal.

Explorer.—Following in the wake of the sailor comes the explorer. I had intended, when I first sketched out this paper, to give an imaginary explorer's map of a journey across this island, but I have the privilege of showing you something so infinitely precious that I feel it would be a piece of bathos to concoct a sham map. Here I have two of Dr. Livingstone's own original manuscript maps made on his last journey, kindly lent me for to-night by his daughter, Mrs. A. L. Bruce. Here we have no conjectures as to what the traveller might do; here are the real power, the actual materials of geography. Instead of imagining what an explorer should take with him, I may mention Livingstone's actual equipment:—a 6″ sextant; an artificial horizon; a pocket chronometer; a prismatic compass and a pocket compass; two boiling-point thermometers and two common thermometers; aneroid barometer; a *Nautical Almanac* and a book of mathematical tables.

The sextant, as we have seen, is for taking astronomical, as well as terrestrial angles; the thermometer and barometer for taking heights. The principle on which the latter are calculated is the pressure of the atmosphere. The aneroid everybody knows; the boiling-point thermometer is considered better and more accurate, though I observe from Livingstone's notes—who was the most painstaking and thorough observer, and who always observed with both—that there was little practical difference in the readings. Roughly speaking, water boils at sea-level at 212° Fahrenheit, and the barometer stands at 30 inches, while at 5000 feet altitude water boils at 202°·6, and the barometer falls to 24·7 inches.

The traveller in unexplored parts generally estimates his distances from the time taken at the average rate of marching, just as on board ship distances covered are roughly taken from the average rate of the ship indicated by the log. He takes compass bearings as he goes, and

keeps an itinerary recording all useful information gathered on the march. He corrects his reckoning by taking daily latitudes, and at greater intervals, say once a fortnight, longitudes from moon observations if he can. He notes heights, gets reports from natives of estimated distances, and in fact gathers all the information he can on every subject—rainfall, botany, zoology, anthropology, and so forth. Livingstone did all these, and did them thoroughly. A whole lecture could be written on these maps I hold in my hand. Here is one of his notes :—

"Eight days up this river 96 miles, then cross and go three days, say 36 miles, to stone houses 132 miles—course S.W. Lobula, comes to N.E., has dark water."

A traveller with his wits about him can do much with very rough instruments, or even with none at all. He can train himself to use his fingers for rough angular measurements, and he can improvise in many ways. My own old chief, the late Colonel W. B. Holmes, R.E., used to make wonderful surveys with his watch alone.

One great geographical problem—where does the huge river Sang-po, which flows in Tibet at the back of the Himalaya, discharge its waters?—was solved by a native surveyor, A. K., sent out by the Government of India, who was obliged to conceal all his observations. I quote from the official account :—

"For linear measurement A. K. trusted entirely to his own pace or step, which, as hereafter shown, is convertible into the unit of a foot, or any other unit desired ; and notwithstanding that in Mongolia he was looked down upon as a particularly inferior individual, because, unlike the Mongols, he persisted in walking instead of following the universal custom of the country, which enjoins riding a horse on all possible occasions, he yet manfully strode along his travels, pleading poverty, or otherwise, until at last, on his return journey along the eastern flank of his route, the Láma with whom he had taken service insisted on his riding, if only to promote flight from robbers, especially the mounted bands of Chiámo-Goloks, of whom travellers are in constant dread. Thus compelled, A. K. mounted a horse, but here also he proved equal to the occasion, for he at once set to work counting the beast's paces as indicated by his stepping with the right foreleg. In this way he reckoned his distances for nearly 230 miles, between Bárong Chaidam (lat. 36° 5′, long. 97° 3′) and Thuden Gomba (lat. 33° 17′, long. 96° 43′), and the results do credit alike to the explorer's ingenuity and to the horse's equability of pace."

An account of his journey will be found in the *Scottish Geographical Magazine* for 1885, p. 352.

After the Explorer comes the SURVEYOR. His business is to produce a detailed survey or map of the country. The operations of a cadastral[1] survey on a grand scale, generally made by the Government, are divided into two parts : (1) the great triangular survey, and (2) the topographical part, or the filling in of the details required for civil information.

Before we go further we should gain a thorough idea of the principles of triangulation, because on it are founded all the conditions of an accurate

[1] A cadastral survey is properly and etymologically a survey made by a government for fiscal purposes. The word being derived from the Low Latin *capitastrum*=a register for a poll-tax. As such a survey was naturally carried out with the utmost completeness, the term "Cadastral Survey" came to be used equally with the term "Ordnance Survey," for the great Government Survey of Great Britain and Ireland.

map. The great property of a triangle is this, that of all plane geometrical figures it is the only one of which the form cannot be altered, if the sides remain constant, and that the three angles of a triangle are together equal to two right angles, so that if we know two of the angles of any triangle we can at once calculate the third angle by subtracting the number of degrees in the two known angles from 180 degrees, which is the sum of two right angles. If also we know the length of one of the sides of the triangle as well as the number of degrees in the angles, a very simple mathematical formula enables us to calculate the length of the other sides.

Now this is exactly what is done in the great trigonometrical survey made in this country by the Ordnance Survey:—The Surveyor measures what is called a *base line*. He purposely selects an absolutely horizontal plane otherwise conveniently situated for the purpose of measurement. The base line is seldom more than five or six miles long, but it is measured with "every refinement which ingenuity can devise or expense command." In the Ordnance Survey of the British Isles—to give an idea of the care with which such base lines are measured—the original base line, which was on Hounslow Heath, was measured in 1791, first with a steel chain, then with deal rods, next glass tubes, and lastly, again with the chain; and was over five miles long. Another line was subsequently measured seven miles long, on Salisbury Plain, in 1794, which is the base of the existing triangulation. The verification line at Lough Foyle, which was seven miles long, was measured with specially designed compound metal rods of brass and iron, 10 feet long, compensating like the balance and spring of a chronometer, so as to be independent of expansion and contraction, and their contact adjusted with microscopes. From this base once fixed, its latitude and longitude being most carefully taken, the surveyor measures the angles of suitably laid out triangles, and computes the length of their sides. Each of these sides in its turn becomes the base of a new triangle. The surveyor plants his instrument on the spot fixed on and measures new triangles, and gradually covers the surface of his island with a network of great triangles. The length of these sides are all calculated from the angles, not measured, but, as a matter of fact, the lengths of these sides so computed from angular measurements are infinitely more accurate than if they were actually measured with a chain.

So accurate, indeed, was the triangulation of this country that when the Ordnance surveyors verified their calculations 33 years after, in 1827, by actually measuring the check base on Lough Foyle, as already described, the greatest possible error was found to be less than five inches. This, be it remembered, was calculated from the base in Salisbury Plain, only seven miles long, at a distance of over 300 miles. The mean length of the sides of the triangles was 35 miles, and the longest side was 111 miles. The history of the triangulation is quite a romance, but Sir Charles Wilson referred to all this at length, last month.[1]

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[1] *The Scottish Geographical Magazine*, vol. vii. p. 248. An admirable popular account of the operations of the Ordnance Survey will be found in *The Ordnance Survey of the United Kingdom*, by Lieut.-Col. T. P. White, R.E. (Blackwood, 1886).

The instrument with which the angles are measured is the theodolite. This net-work of triangles so laid down is the backbone of all details of map-making. All these imaginary sides of triangles are, like the parallels of latitudes and meridians on large maps, the lines to which all the filling in of detail is referred. Every point on this net-work is absolutely fixed, and from these points, as from the line of lamp-posts we considered at the beginning, all details are measured. The great triangulation in the Ordnance Survey being complete, the officers then lay off from the great triangles what are called secondary triangles, the sides of which are about five miles in length, and, where necessary, tertiary triangles, with sides of about one mile in length, and from them the surveyor breaks up the interior of the triangle with a net-work of cross lines, all self-checking when laid on the paper, and this is the beginning of ordinary land-surveying.

Land Surveying.—The filling in of a survey is like writing a book. Men work differently. No two surveyors use exactly the same method of working, and it very much depends on the nature of the ground, the extent of his resources, and the accuracy of detail required what method the surveyor employs. In a theoretically perfect survey the triangular system would be pursued throughout, but in practice this is not necessary, nor is it done.

Of the methods of filling up, which are several, I will briefly describe two or three of the principal:—

Traversing with the Chain and Theodolite.—A traverse is defined as a circuitous route performed on leaving any place on the Earth's surface by stages in different directions and of various lengths with a view of arriving at any other place; the angles which the stages (or station lines) form with the meridian (*i.e.* the north and south line) are called bearings. In other words, it is a walking from point to point in straight lines, always recording your distance and your direction.

These traverse lines are measured with the chain. They are generally laid out round the country to be surveyed, and are as multifarious as the necessities of the ground require. The bearings in a good permanent survey are measured with the theodolite, and when the traverse is complete it should be closed where begun, when, if no error is made, the bearing of the first line will read on the theodolite exactly as it read at the beginning. Cross checks and connecting lines are constantly taken to test the accuracy of the work, and, while the survey is going on, the measurements of all the features of the country are set down in what is called the Field Book. Where the line does not cross the natural features, perpendiculars, called offsets, are set off and measured from the traverse line to the bends and angles of all surface details—bends of streams, fences, houses, roads, and so on, and so the map gets filled in bit by bit. Either it is set off at the beginning from the Ordnance triangulation, or subsequently joined to it by trigonometrical measurements. Such detail may be made piecemeal and fitted in like a Chinese puzzle to the main map of the country and altered, or more minutely surveyed, according to requirements. For rapid and not very accurate purposes exactly the same methods may be adopted as for a military reconnais-

sance or sketch map, by pacing the traverse lines and taking the bearings with the prismatic compass, and this is what is generally done in military sketches. All these operations and measurements are noted in a field book, and are afterwards taken to the office and "plotted" on a sheet or sheets of paper.

There is also a contrivance for filling in a survey, with which no field-book is used, but by which very fairly accurate work may be obtained. It is very little used in this country except for military purposes, and then generally in a modified form shortly to be noticed; but it is much used for topographical work in India and on the Continent, and the United States. This instrument is the *plane table*. It serves itself as a theodolite, and the plan actually grows on the ground without after office-work.

Contour Lines.—A very important part of a cadastral survey is the plotting on the map of contour lines, or lines of equal height. This is done after the features of the surface have been mapped. To draw the contour lines we must have a starting-point, or, as it is called, a datum level. In our Ordnance Survey this is the level of the mean tide at Liverpool.

From the datum great lines and cross lines of levels are run all over the country, covering it with a net-work; and at all convenient spots the heights are permanently recorded by the well-known Broad-Arrow, and called bench-marks. Wherever the Broad-Arrow is found engraved on the ground, its height from the datum line will be found in the Ordnance map of that part of the ground. A very common spot to find an Ordnance bench-mark is the keystone of the arch of a bridge, which would naturally be the last thing to be removed. These levels are got by spirit-levelling. When the main levelling operations have been completed, the surveyor fixes at what intervals of height his contours are to be drawn.

The surveyor starts, let us say, to determine the line at 100 feet above datum. He goes to the nearest bench-mark he has to this height,—say it is 105 feet. He levels down until he finds a point 5 feet below this bench-mark. There he leaves a flag, or a peg, and goes on finding point after point at the same level; that is, he must read the same figure on the levelling staff. These points he then surveys as he would any natural feature, and permanently marks the imaginary lines joining them on the map, thereby showing a line of equal heights.

Military Sketch, or Reconnaissance, is a form of map which ought not to pass entirely undescribed. The object of a staff officer in making a sketch is to give such a representation of the nature of the ground as will give useful information to his general. It may take any amount of elaboration—may be as complete as a cadastral survey taken with instruments of precision, or it may be merely the roughest indication of the nature of the ground, taken with such instruments as may be carried in the pocket, or even improvised without instruments, and be a mere eye-sketch of the features of the ground. As the military information generally desired is the nature of the ground—whether

suitable for manœuvring, for artillery, for cavalry—the nature of the roads, of the hills, of the rivers, should all be looked to, and rough contouring and hill-shading is a very important part of the officer's work. He must also get information of defensible spots, of the water supplies, the food supplies, and the resources of the country, and this should be embodied as much as possible on the plan, or on the report attached to it.

Though any degree of elaborateness may be used, any instruments of precision employed, the typical military sketch is made with a sketching case, which is merely an improvised plane table. The main lines or traverses are taken from the bearings of the prismatic compass laid down on the sketch itself. The lines are generally paced or guessed, distant objects fixed by bearings from the station points, and the contouring measured angularly by Abney's level, or sketched by the eye. The shading of the hills shows steepness by the lines used to indicate them being drawn closer or further apart.

Cartographer.—The plans and maps having been drawn, and all notes made of information, they reach the cartographer or atlas-maker. His duty is first to compare all new information with what is already known. To eliminate manifest errors, to reduce to scale and to projection uniform with his great maps of the same part of the world, and generally to make everything ship-shape for publication.

Atlas Making.—I do not here refer to the Ordnance Survey maps, drawings, and prints, which were described with the utmost detail and precision by Sir Charles Wilson, but to the general atlases, such as Johnston's and Bartholomew's. With the information so gleaned the cartographer is able to make those beautiful orographical maps, which are now so common, showing different levels.

In our diagram I have coloured the island orographically, which is done by drawing the contour lines and washing over the areas so marked with different variations of tint. But I shall not go far into this subject. Mr. Bartholomew must do that some other day. Imagine the map drawn. It may be then engraved, like any other picture or line engraving, on a copper-plate, and either printed from that plate or from lithographic stones, to which an impression of the plate has been transferred.

In the Ordnance Survey printing-office, instead of lithographic stone, the maps are printed from sheets of zinc, which has much the same property of absorbing greasy ink.

By this time we have got into the printing-office, and to describe it in detail would be beyond my province; this part of the subject, though very interesting, really embraces the whole art of the engraver, the lithographer, and the printer. But there is one process I desire to show before closing.

You see daily in books and newspapers, and in our own journal, maps printed in black along with the type. There are numberless processes for their production—one only I shall briefly note. It is the type-process of Messrs. Walker & Boutall, who have kindly sent me a specimen in course of manufacture.

On a brass plate a coating of a waxy composition is laid; the outlines

of the map are either drawn on this coating or photographically transferred to it. The engraver then scratches through the wax down to the brass with a needle. He next takes suitable types, and stamps in the names also down through the wax to the brass, and completes the matrix with the necessary amount of detail, which may be great or little. After verification and correction the matrix is ready for electrotyping. You who know the appearance of stereotype moulds will see that this resembles the mould of an ordinary stereotype or electrotype page. The mould is next covered with black-lead, and an electrotype taken from it, when all the punctures that have been made through the wax to the level brass plate come out level—the scratches as lines, and the type as lettering. It is then mounted on wood, and is ready to insert among type and be printed along with it.

I have tried to give you very roughly an outline of how maps are made from the beginning to the end, in almost the same form that actual necessity forced me to learn it for practical use.

REWA RIVER, FIJI.

By H. H. Thiele.

(With a Map.)

It is with the view of contributing some useful information about a small part of Fiji that I take the liberty of laying this paper before the Royal Scottish Geographical Society.

During the last thirty or forty years several books have been published describing these islands and their inhabitants, but, without being exactly unfaithful to the subject on the whole, the authors have evidently written with a view to the sale of their books rather than for the purpose of imparting accurate and useful information. Dr. Seemann's *A Mission to Fiji* forms an honourable exception, but yet I cannot help thinking that if he had resided five or six years amongst the natives of these islands, the experience he would have gained would have led him to alter his opinion on several subjects relating to them.

The Fiji group consists of two large islands, Viti Levu (Large Viti) and Vanua Levu (Large Land), and upwards of 250 smaller ones, ranging in size from over 200 square miles (Taviuni) down to islets consisting of an acre or less of barren rock. All the islands together make up an area of about 7400 square miles, of which about 4200 square miles belong to Viti Levu, the island dealt with in this paper.

A cursory glance at a map shows that the island of Viti Levu is of an oval shape; it is about 97 miles long from east to west, and 67 miles across from north to south at its broadest part.

Although the island is of no great extent, its climate varies very considerably in different parts; generally speaking, the southern and eastern districts and the greater part of the interior receive plenty of rain, while

the northern and western parts, especially the coast-lands, are considerably drier. The mountain ranges, the general direction of which is from north-east by north to south-west by south, are highest in the interior, where they attain a mean height of about 3000 feet, and they cover a greater area in the western than in the eastern half of the island. The south-east trade-wind prevails for about two-thirds of the year; it comes from the ocean laden with moisture, and, striking the eastern sides of the ranges, sweeps up their slopes till it reaches an altitude where, owing to the fall in temperature, some of its moisture is condensed and falls in rain on the windward side of the mountains. The average yearly rainfall on the south-east corner of the island, at Suva, the capital, is about 105 inches; at Viria, further inland and closer to the mountains, 145 inches; and at Ba, on the north-west coast, probably not much more than half of the latter quantity. No very reliable meteorological observations have so far been taken in that part of the island, but it may be noted that irrigation has to be resorted to there, in order to cultivate sugar-cane successfully.

From the circumstances stated above it will be easily understood that the principal rivers must be found in the southern and eastern parts of the island. The Siga Toka is by far the most important river in the middle and southern parts, while the Rewa holds the same position in the eastern half of the island. The former enters the ocean on the south coast, at about 177° 30′ E. long., and the so-called delta of the latter occupies the south-east corner of the island. Besides these there are two other rivers of minor importance, viz.. the Navua, which, rising somewhere to the south-east of the centre of the island, pursues a southerly course till it reaches the ocean about midway between the mouths of the Siga Toka and the Rewa; and the Ba River, the basin of which occupies the north-western corner of the island. These four rivers are the only ones on Viti Levu of any importance to traffic. Numerous creeks are found all along the coast, carrying the water from the slopes of the nearest ranges to the ocean.

In the northern part of the island the watershed between the Siga Toka and the Rewa is formed by the so-called Dividing Range.

The length of the Siga Toka cannot be estimated with any approach to exactness, as it is not decided which of the many head-waters should be regarded as the main stream. It runs for nearly the whole of its course through deep gorges in the most mountainous part of the interior; only near the mouth do extensive fertile plains and sandy hills lie beside its banks. It is full of rapids, shallows, and deep holes, and a dangerous bar obstructs its mouth; it receives many affluents both from east and west, all more or less of the same character as itself. During the rainy season an immense volume of water comes rushing down this treacherous river, while in the dry season there is in many places not sufficient water to float a laden native canoe. That the scenery on this river is magnificent can easily be imagined: in the north the banks are mostly formed by steep and high walls of barren rocks, and the narrow river-bed is strewn with large and small fragments of conglomerate, thrown or rolled into it during volcanic disturbances, between and over which the

water rushes along with great speed, forming whirlpool after whirlpool and an endless succession of foaming cascades. Any one who has seen the "Elvs" of Old Norway cannot help being struck by the great resemblance, especially if the hour happens to be early morning or late afternoon, when a gloomy twilight increases the wildness of the scenery, and seems to add to the darkness of the water in the deep pools and bring into greater contrast the silvery whiteness of the countless little waterfalls. A turn of the river and, may be, the whole scenery is changed from a Norwegian to a thoroughly tropical one. You pass into a narrow valley, where tree-ferns, wild figs, and smaller tropical plants occupy every inch of ground, and the more sloping sides of the ranges on either side are covered with dense forest from foot to crown: you might fancy yourself in the interior of Guadeloupe, or some other West Indian island. Where fertile flats of sufficient extent to produce the necessary food for the inhabitants occur, native villages stand on the banks. The Fijians here, and on the mountains generally, are called "Koi Colos"; they were the last of all the tribes to submit to British rule, and even now the greater part of the interior is included in the so-called "Disturbed District," through which a white man can travel only by special permission from the Government.

Leaving the Siga Toka, I will now proceed to the description of the Rewa, which is the principal subject of this paper, as the river happens to run through the district of Viti Levu with which I am best acquainted.

In the north-eastern part of the mountain ranges lie the sources of numerous water-courses, which, with the exception of a few comparatively unimportant ones, make direct for the north coast, and join one of the two following rivers: the Wai-ni-Buka, the most northerly, and the Wai-ni-Mala. These, after very tortuous courses of some 30 miles, meet to form the Rewa. The length of this river is about 42 nautical miles,[1] and its general direction is towards the south-east. It receives numerous affluents both from the north and south, but only two are of any importance. These are the Wai-Dina and the Wai-Manu, both coming from the west. The former flows into the Rewa about 28 miles, and the latter about 10½ miles, from its mouth.

It may fairly be reckoned that the Rewa drains one quarter of the entire island of Viti Levu, or about 1000 square miles. Taking the average rainfall in this basin at 120 inches per annum, and allowing 25 per cent. for evaporation and absorption, this river carries yearly about 5800 million tons of water to the ocean. Evaporation must necessarily be small, where rainy and cloudy days are so very frequent and dry winds never occur; besides, probably half of the total quantity stated above is carried down during floods or heavy freshets—which last from three to six days at a time, and occur on an average about six times yearly—and soon reaches the sea. Nor can the quantity of water absorbed be very large, owing to the impermeable nature of the river-bed, for the hills, where they are not of hard rock, are principally formed of soapstone,

[1] When miles are mentioned subsequently, they are "nautical" miles.

which, once saturated, hardly ever gets the chance of becoming dry again. The same to a great extent is also the case with the clayey soil on the flats, and the peaty soil has quite a remarkable power of retaining moisture, owing to its resting on layers of clay and being covered with a thick vegetation of rank grass and reeds.

The effects of the force of this considerable mass of water making its way towards the sea shows itself in several ways. The river-bed gets deepened in some places, while shallows are created in others, banks are undermined and carried away, and the materials formed into islands elsewhere. These changes are continually going on, slowly certainly under ordinary circumstances, but with all the greater violence during heavy floods. In the five or six years I have been here the channel of deep water in the lower part of the river—from Dreke-ni-kelo to the sea—has altered to such an extent that in one or two places islands now exist where previously the deepest water was to be found. Immediately after a heavy flood or freshet the river on the whole gets shallower; in course of time, however, and especially as far as the tides take effect, a channel is formed of about the usual depth.

From Laucala bay to the Navoloa mouth of the river the coast-line is formed by a succession of mud-flats, sandy stretches, and some fringing reefs: on the whole it is rather low, though a portion of it between Nasoata and Nasalai rises to an elevation of from 30 to 40 feet, and Kaba island is more than 100 feet over high-water mark. Mud-flats of varying breadth, more or less overgrown with mangrove bushes, line the bays and the banks of the lower portion of the river. The coast-line proper is in many places difficult to define, as the tides cause it to vary very considerably; in the accompanying chart it has been laid down on the line of ordinary high-water mark.

The difference of tides at the mouths of the river is about 3 feet under ordinary circumstances, and upwards of 6 feet during spring-tides. At Nansori, about 10 miles from the coast, the difference is $3\frac{1}{2}$ feet under ordinary circumstances, and $4\frac{1}{2}$ feet at spring-tides. At Naitasiri, 20 miles from the mouth, the usual tidal difference is $1\frac{3}{4}$ foot, with $\frac{3}{4}$ foot added at spring-tides. No tides are felt above the place where the Wai-Dina joins the river. Strong easterly or south-easterly storms increase the flood-tides to some extent. Seeing that the Rewa has six large mouths, it may be easily imagined that the tidal currents are very complicated in its lower portion, a circumstance which, combined with the effects of strong winds, considerably increases or retards the outflow of water. At the Nukulao, or principal, mouth of the river a sand bar has been formed with only about 4 to 5 feet of water on it at ordinary low-tide. A vessel drawing 3 feet requires $\frac{3}{4}$ flood-tide to go up river as far as Bau Levu. It is hardly conceivable with such tides, combined with the usual south-easterly wind blowing fairly on to this part of the coast, how a delta could ever have been formed. The depth of the sea outside the reefs is considerable, and also in the passages leading through the reefs; where the water is deep, mud is always found at the bottom, an indication that the sediment of the river ultimately settles there. The existing mud- and sand-flats were no doubt formed by the sediment of the

river, but they are all placed in localities well protected from the tides; I do not think they are increasing in size on the whole, though no doubt small changes take place now and then. The higher ground at some parts of the coast mentioned above also tells against a delta formation, unless it can be shown that these hills were formerly separate islands, which in course of time have become one with the mainland. The really dry land is, as far as Rewa town on the three southern branches, not more than 2 or 3 feet above ordinary high-water mark, and even a very heavy flood does not cause an extra rise of one foot down here, although it may swell the river at Viria to 47 feet above the usual level, and some 18 or 20 feet at Nansori.

The Laucala branch of the river is the most important, owing to its being the shortest waterway between the capital, Suva, and the Rewa district, the most populous and best cultivated part of Fiji. The place where this branch breaks away from the main river is called Hellsgate; it is a difficult narrow to pass through without running aground, as the channel is continually changing from one side to the other of the little island called Kata-na-elewa. Nearly opposite Hellsgate lies Rewa, the largest native town in Fiji; it has a Roman Catholic chapel and also a Wesleyan church. The men are known as good canoe-builders, and the women make some of the best crockery ware in the whole group. Opposite the town the river is about 400 yards broad, but from here upwards it diminishes pretty regularly in width, the banks generally increasing in height. The land on both sides continues quite flat, and is cultivated by Europeans or natives, nearly all the way up to Nansori, where the first hills are met with. Mould resting on clay layers is the usual formation of the soil found on the flat land along the river banks. On the chart will be noticed a red dotted line drawn almost parallel to the river bed at Vuci-Maca; this signifies an older bank of higher elevation. Such old banks are found in several other places, and even now they often confine the river during very heavy floods. The hills are nearly all of a uniform height (from 80 to 100 feet), and are evidently formed by pluvial denudation; most of the fertile soil has been washed off them on to the plains or into the river, leaving exposed steatite (soap-stone) or some other heavy clay resting on a hard sedimentary base-rock. Trees grow well enough on them, but as yet they have not been much cultivated for useful purposes. Having become narrower and deeper just opposite the Nansori Sugar Mills, the river again widens out opposite Elliston, where a large sand-bank has been formed and is now half-covered with grass. Another old river bank, higher than the one at Vuci-Maca, commences near Elliston, and extends beyond the native village at Verata. A little further up, at Dreke-in-kelo, the river makes a very sharp turn to the westward, forming quite a right angle with its previous course. From the mouth to this point is called "Lower Rewa," from here to Bau Levu is "Middle Rewa," and the rest is "Upper Rewa." During heavy freshets a perfect whirlpool is formed at Dreke-in-kelo. and the depth of water on this spot considerably increased. Boats have no chance whatever of getting out, if once drawn into it, and even steamers under full speed have been carried round and round for hours

together. It is quite an amusing sight to watch the very mixed collection of floatables of different description, which is here kept dancing round in large and small circles. Native canoes are often torn away from their fastenings by the sudden rise of the river and carried away, but they never get beyond this place as long as the freshet lasts. From Nadurulolo the river has a comparatively straight course to Naitasiri; on either side the flat land is found in narrow strips only, and in several places bush-covered hill-sides descend to the water's edge. At Naitasiri a range more than 200 feet high commences on the right bank, and takes a westerly direction; on the opposite side lies an extensive flat between the river and the foot of the hills to the eastward. Owing to the tortuous course between here and Bau Levu, combined with a narrower bed and rocky bottom and banks, with generally a swifter current, the navigation requires considerable care and local knowledge. From Ban Levu to Vuni-cibi-cibi another large flat is formed between the river course and the foot of the hills on the right bank. Opposite Muanaweni the river for a short distance gets broader and very shallow; this is probably caused by the river water from above meeting for the first time the checking influence of a contrary tide: under certain circumstances the water comes to a stand-still, whereon many of the particles carried by it in suspension are precipitated. Above Wai-Dina, at a place called Viria, is the last flat of any importance: it is used, like most of the others on the lower river, for the cultivation of sugar-cane. A couple of days' steady rain in the mountains will often cause the river at Viria to rise 30 or 40 feet, and it has been as high as 50 feet above the ordinary level. With the exception of a few patches of land on which the natives grow bananas, there is no cultivation on the Rewa above Viria. No steamers go beyond this place, and canoes only are used for traffic further into the interior. The river from here upwards keeps a pretty uniform width of less than a hundred yards; on both sides the banks are formed by the slopes of bush-covered hills, seldom more than 100 feet high; low islands formed of coarse gravel are numerous, and about half-way between the Wai-in-mala and Viria the first rounded pebbles and stones are met with in the river-bed. The land of the surrounding district has not yet been surveyed, and the exact courses of the numerous creeks are therefore still unknown: this must be borne in mind when looking at the chart, where only their junction with the main river is given. Most of them drain hills and valleys many miles away, but, as I could not give their precise course, I have not shown any.

The distances to which under ordinary circumstances the different materials are carried away in suspension or pushed along the bottom by the river water are rather distinctly marked on the Rewa. Stones do not reach Viria; coarse gravel settles between there and Nadurulolo, finer gravel and sand are found in the Lower Rewa, while the mud is carried down to the sea. I do not mean to say that there is no mud in the river-bed, or no sand in the Middle or Upper Rewa, but that no final settlement of these finer substances takes place until after the water has lost power to move stones or pebbles and carry gravel in suspension. Where mud is found in the river-bed it is still, though perhaps slowly, in

motion towards the coast; the ebb-tide brings a large quantity with it to the sea, but the flood-tide also carries a considerable quantity of mud and sand, which had nearly reached the coast, up-river again. Thus many of the finest particles held in suspension by the water probably have to pass down and up the part of the river affected by tides a couple of times before they ultimately reach the ocean.

It is worth notice that on the flats the land close to the river banks is generally higher than that further away; when, therefore, floods occur here, they are not caused by the river overflowing its banks, but by the swelling of creeks near the foot of the hills, or by the water flowing from the river into the back-land through the same creeks, which under ordinary circumstances bring water to the main stream. As an average result of a good many trials at Nansori during a flood, which caused a rise of about 18 feet over ordinary water, I found that the speed of the current in the middle of the river did not exceed $4\frac{1}{2}$ miles per hour. At the same time the matter held in suspension was $\frac{1}{1000}$ by weight; this is about ten times more than under ordinary circumstances. These figures were obtained by weighing a quantity of river water and finding the weight of the residue after evaporation.

The only evidences of active volcanic action in the Rewa basin are some hot springs in the Wai-Dina, too far to the westward to be shown on the chart. I have not seen them myself, or been able to obtain a reliable detailed description of them.

The scenery on the Rewa is totally different from that on the Siga Toka: there primeval Nature displays a grand variety of forms; here almost everything has been interfered with by the hand of man. Signs of civilisation are met with everywhere in the form of well-built cottages, with pretty gardens, and large plains planted with sugar-cane. Steamers, cutters, boats, canoes, and bamboo rafts are continually on the move; permanent tramways, worked with locomotives, have been constructed at Nansori, Naitasiro, Bau Levu, and Viria; and at Nansori for six months of the year the electric light turns night into day. Even the hills have not been spared, and a tunnel through a range at Viria allows sugar-cane grown along the Wai-Dina to be transported by rail to the Viria Mill. Above this place Nature holds the sway; the scenery, however, is very monotonous; nothing but bush-covered hills, where the trees are so hidden by creepers that it is almost impossible to determine their species; here and there fern-trees vary the general effect by thrusting their graceful fronds high above the other vegetation. Coco-nut palms, so conspicuous and numerous on the lower river, are very scarce up here, for they love sea air and salt water, and do not thrive far from the coast.

From the above description of the Rewa the following main points may be selected:—(1) The headwaters of its principal affluents have their springs in a very mountainous district of decided volcanic origin. (2) The basin generally consists of a series of irregular ranges or isolated hills of argillaceous composition, with alluvial flats between them or along the river banks. The coast is protected by coral reefs, with openings corresponding to the different mouths of the river.

A few words about these coral reefs may not be out of place here.

It is generally supposed, as stated by Darwin, that Viti Levu is one of those islands which are gradually being submerged, while their barrier reefs are being built up as fast as the dry land disappears. I trust, however, it will not be looked upon as presumption on my part if I state that I am of a different opinion. To support the conclusion I have arrived at, I would point out—

(1.) At Ovalau, an island about fifteen miles to the north of Kaba, the reefs are exactly of the same description as those at the mouth of the Rewa; in fact, they may be considered a continuation of the latter, interrupted in two places only by narrow channels. Opposite the port of Levuka, on the east coast of Ovalau, there is a passage through the reef which admits a considerable sea during strong easterly winds: the coast opposite this opening is in some places formed of hard conglomerate rock, which for a considerable distance along the shore has been thoroughly undermined and eroded by the action of the sea, at a height of two or three feet *above the line* at present reached by the water during spring-tides.

I consider this a decided proof of emergence, and, if Ovalau is rising, it is highly improbable that Viti Levu is sinking.

(2.) The coral reefs on the south-east coast of Viti Levu are exposed too long above water during ebb-tide to be "growing." Some parts of the reefs are exposed at half-tide.

Such are my principal reasons for believing that the island has been slightly rising in recent times, though it is hard to say whether it is still rising or stationary.

For Rewa district this is an important question. If the river navigation should become considerably more difficult than at present, a railway between this district and Suva would become a matter of necessity for the transport of sugar to the mills.

The accompanying chart cannot boast of artistic execution, but I think it will be found *quite* correct.

Note.—In pronouncing Fijian words the following rules should be noted:—

Letter *a* is pronounced as in the word *lamb*.

b	,,	as *mb*; *Bau* is pronounced *Mbau*; *Ba* = *Mba*.
c	,,	as *th*; *ca* ,, *tha*.
d	,,	as *nd*; *Dina* ,, *Ndina*.
e	,,	as *a* in *fate* and *late*.
g	,,	as *ng*; *gaga* is pronounced *nganga*.
i	,,	as *e* in *me*.
q	,,	as *ngg*: *Koroqaqa* is pronounced *Koronggangga*.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

A SPECIAL MEETING of the Society was held in Edinburgh on the afternoon of Friday the 17th July. Mr. A. L. Bruce presided. A paper on "Matabele-land and Mashona-land" was read by Mr. Denis Doyle, who was accompanied to the platform by Gungunhana's envoys, Huluhulu and Umfeti. Dr. George Smith moved the vote of thanks to the lecturer.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

The Population of Norway.—On January 1st, the total population of Norway amounted to 1,999,176 (*Foreløbige Resultater af Folketællingen i Kongeriget Norge*). In 1876 the number was 1,813,424, so that the increase in the last fifteen years has been 185,752, or 10·2 per cent. The numbers of inhabitants in the larger towns are as follows, the figures in brackets indicating the population in 1886 :— Kristiania, 150,444 (130,027) ; Bergen, 53,686 (47,075) ; Trondhjem, 25,051 (23,979) ; Stavanger, 23,930 (23,911) ; and Drammen, 20,684 (19,601).

Migrations of the Lapps.—During the last two centuries the Lapps of Norway have been moving gradually southwards, preserving their uncivilised and nomadic mode of life in their new environment. Dr. Yngar Nielsen of Christiania has recently studied this interesting ethnological question (*Vide Le Tour du Monde, Nouvelles Géog.*, p. 137). According to him the southern limit of this people is now marked by the railway from Trondhjem to Östersund, nearly along the 63d parallel of N. lat. To the north of this line are found ancient tombs, places of worship, and names of Lappish origin. Here the Lapps of the present day, though nominally converted to Christianity, retain in secret some of their pagan customs, whereas further south they are good Christians, and have changed even in type. About the year 1600 the southern limit of the Lapps was on the parallel of the northern extremity of the fiord of Trondhjem ; since then they have made several excursions southward, and have been repeatedly checked by the Norwegian Government. In 1890 they advanced as far as the plateaus of the Hardanger Fjeld. The Norwegians do not resort to violence, but defend their property by legal processes. The question of the Lapp invasion is, however, one that demands the serious attention of the Government.

Ascent of Mt. Elbruz.—In July 1890, G. A. Pastukhoff, of Tiflis, ascended this mountain with the object of making topographical surveys. Both summits are caldron-shaped, and on the edge of each rise three distinct peaks. The highest of these on the eastern summit is 18,353 feet above the sea-level. (The height of the western summit is 18,470 feet. See *Scottish Geog. Mag.* vol. vi. p. 319). Both summits are undoubtedly extinct craters. On the descent M. Pastukhoff and his men were nearly lost in a violent snow-storm.—*Deutsche Rundschau*, Jahrg. xiii. Heft 9.

ASIA.

Trans-Asiatic Journeys.—M. Paul Barré contributes to the *Revue Française* (April 15th, 1891) a short paper on this subject, from which we extract the following. The Dutchman, Ruysbroeck, visited Mongolia between 1246 and 1273, but, though he advanced far towards the east, he did not succeed in reaching the Chinese coast. The first European to traverse the whole continent was Marco Polo (1271-1295), who, passing through Turkestan and China, entered Pekin, and extended his journey even to Japan. Irmak Timofeef, a Cossack brigand, opened Siberia to Muscovite influence (1530) ; and Elisée Bouza (1635), Kopylof (1639), and Sladukhim and Ignatief (1644) succeeded in reaching the north-western limits of this country. Dejnef, in 1648, reached the Gulf of Anadir, and ascertained the existence of a strait between Siberia and America before Behring sailed to that

region. Again, Baikof crossed Mongolia in 1654, and entered Pekin as ambassador of the Tsar. From this time Russian explorers in Siberia became very numerous, but no one followed in the track of Marco Polo until quite recently. Ney Elias crossed Central Asia in 1872-73 ; M'Carthy travelled from Shanghai to Bhamo in 1876-78, and thence to the coast ; Joseph Martin has crossed Siberia twice ; Benoist Méchin and Mailly Chalon journeyed from the Ussuri to Bokhara and Merv ; and Przhevalski penetrated as far eastwards as the sources of the Whang-ho. Still more recently (1889) Younghusband traversed Central Asia from Pekin to India, and Bonvalot (1889-90) passed from Siberia through Tibet to Southern China.

The Population of Siam.—*Deutsche Rundschau*, Jahrg. xiii. Heft 9, gives an estimate formed from the communications of railway engineers and other recent travellers. The number of the present inhabitants is probably about 12 millions, of whom 3½ millions are Siamese, 3½ millions Chinese, 2,600,000 Shans, Laotians, and Burmese, 1 million Cambodians, 1 million Malays and Hindus, and the remaining 400,000 members of various small tribes.

Corea.—*The Times*, May 20th, gives a melancholy account of the Coreans, extracted from a Japanese paper. An evil genius, says the correspondent, seems brooding over the life of the Corean people, paralysing every nerve and muscle. This evil genius seems to be nothing else than a wretched system of government, or, rather, the absence of anything deserving the name of government. The aristocracy, by unjust taxation, persecution, and violence, extort from the agricultural population the small surplus of their earnings which remains after their absolute necessities are satisfied. Consequently the villages have a desolate appearance, the roads are execrable, and stagnation prevails throughout the country. Yet the peninsula is remarkably rich in natural products. The gold deposits must be of value, for, even now, dust to the value of about £500,000 is exported yearly. There are rich mines of anthracite in the north, and iron, copper, and lead await the miner and manufacturer. But, as long as abject poverty is a man's sole protection, the country cannot make progress.

AFRICA.

Portugal and the Congo State.—On May 25th a convention was signed at Lisbon which has put an end to the dispute concerning the possession of Lunda. The boundary will follow the course of the Kwango southwards to the 8th parallel of S. latitude ; then it will proceed eastwards along this parallel to the Kuilu and down this river to the 7th parallel ; along this parallel to the point where it strikes the Kasaï ; finally, along the Kasaï to the lake Dilolo and the watershed between this river and the Zambezi. Another convention, signed at Brussels on the same date, settles the limits of the Cabinda territory and the frontier near Noki and along the river Congo.—*Revue Française*, June 16.

Census of the Cape of Good Hope.—The *Preliminary Report of the Director of the Census* contains the following figures relating to the population :—Number of Europeans, 376,812 ; of aborigines, 847,542 ; of other coloured persons, 301,385 : total 1,525,739. Since 1875, when the last census was taken, the increase in the colony has been 234,300. Since then Griqualand West has been added, with a population now amounting to 83,115, and several native territories containing a collective population of 487,340. The proportion of females to males is 99·03 to 100. The average density is 6·89 to a square mile, as against 3·6 in 1875. The urban population is 318,777, and the rural 1,206,962.

AMERICA.

Alaska.—A preliminary report on the work of the expedition to Alaska, sent out by the National Geographic Society, has been published in the *Magazine* of that Society, vol. ii. No. 5. Messrs. Russell and Kerr, accompanied by Mr. E. S. Hosmer, a volunteer assistant, and seven hands, sailed in June 1890 to Sitka, where the U.S.S. *Pinta* was in readiness to take them to Yakatat Bay. Here Mr. Kerr measured a base-line and commenced a system of triangulation, and before the season was closed had collected sufficient material to map an area of about 1000 square miles. On the first of August the party found themselves midway between Yakatat Bay and Mount St. Elias, having for the greater part of the way travelled over ice full of crevasses. Twenty days more of severe labour brought them to the base of the mountain, at an elevation of 9000 feet. From this point they made two attempts to ascend the mountain, but were driven back by snow-storms. On September 20th they were taken on board the revenue cutter *Corwin* and carried to Sitka.

Population of the United States.—The *Census Bulletin*, No. 16, gives the total population of the United States, on 1st June 1890, as 62,622,250. This number does not include Whites in Indian Territory, Indians on reservations, and Alaska, which would probably raise the total to about 63,000,000. In 1880 the population numbered 50,155,783. The net increase during the decade has therefore been 12,466,467, or 24·86 per cent. In the preceding decade the increase was 30·08 per cent., but the census of 1870 was very defective in the Southern States. In the tables given in the *Bulletin* the States are divided into five groups, the North Atlantic, the South Atlantic, the Northern Central, the Southern Central, and the Western. The rate of increase in the first has advanced from 17·96 between 1870 and 1880 to 19·95 between 1880 and 1890. In the second division there has been a falling off from 29·79 to 16·59, and in the Northern Central from 33·76 to 28·78. The Southern Central and Western divisions show also a decline in the rate of increase, the former from 78·46 to 71·27 and the latter from 54·34 to 39·72. Dakota and Nebraska have increased very rapidly during the past decade, the former by 278 per cent. and the latter 134 per cent. In Washington Territory the population in 1890 was nearly five times that of 1880. On the other hand New Mexico, Arizona, and Utah show very small rates of increase for such thinly-peopled States, while in Nevada there has been an absolute diminution of 26·5 per cent.

The Urban Population of the United States.—*Census Bulletin*, No. 52, gives the population of towns containing 8000 inhabitants or more. The limit is high, but has been adopted in order that the numbers may be compared with those of earlier censuses. In later, more extended, publications it will be lowered to 4000. In 1890 the urban population was 18,235,670, out of a total population of 62,622,250. The ratio of the urban to the total population was 3·35 per cent. in 1790, 22·57 in 1880, and 29·12 in 1890. This ratio shows a regular rate of increase up to 1880, but during the past ten years it has far outstripped that rate. The number of towns having a population of more than 8000 was only 6 in 1790 and 286 in 1880, while in 1890 it had risen to 443. The urban element is very unequally distributed over the country. In the North Atlantic division 51·58 per cent. of the entire population lives in towns, and during the decade the urban population has increased 43·53 per cent., while the total population has increased only 19·95 per cent. In the South Atlantic and South Central divisions the proportion of the urban population is, naturally, small. In 1880 there was

only one city, New York, which had a population exceeding one million, while in 1890 there were three, New York, Chicago, and Philadelphia. Of towns containing more than 100,000 inhabitants there were fourteen in 1870, twenty in 1880, and twenty-eight in 1890. The towns which show the most remarkable growth are Omaha, Neb., 360·23 per cent.; Minneapolis, Minn., 251·35; Saint Paul, Minn., 221·07; Denver, Col., 199·51; Kansas City, Mo., 137·91; and Chicago, 118·58.

Costa Rica.—M. H. Pittier, Director of the Costa Rica Institute of Physical Geography, has written to the Paris Geographical Society (*Compte Rendu*, No. 6, 1891), giving some details concerning a journey he made last year to explore the Pacific slope of the country. The first part of the route from San José presented nothing of interest. The whole district of Candelaria, formerly well-wooded and rich in interesting forms of vegetation, is now stripped of trees, and partly covered with poor grass and a few bushes. At the bottom of the gullies flow insignificant streamlets. At the summit of the cordillera lies the Paramo del Abejonal, a vast prairie where many plants are found not met with elsewhere so far to the north. Passing through San Marcos on the Rio Parrita Grande, M. Pittier proceeded to Santa Maria de Dota, where he made preparations for crossing the mountain Santa Maria. At the last village on the southern side the changes of temperature were remarkable. On the 16th of June a maximum of 79° F. in the shade was observed, while the next morning the thermometer stood at 35°, and the ground was white with frost. The valley of the Rio General is reached from Santa Maria in five days by crossing the Cerro de Buena Vista. This mountain is important from a hydrographical point of view, for the drainage-basin of the river Reventazin occupies the greater part of its northern slope, while on the west descend the rivers Parrita Grande, Naranjo, Savegre, and Baru, and on the south rise the Rio General, Rio Buena Vista, and Rio Chirripó. M. Pittier asserts that the maps of this part of Costa Rica are very faulty, and that his observations will throw considerable light on the geography of the country.

AUSTRALASIA.

Ascent of Mount Yule.—The following account has been sent by our Hon. Corr. Member, Mr. J. P. Thomson:—"The party sent out at the end of 1890 to explore the Kovio Range in the Yule District, British New Guinea, has returned to Port Moresby, after having successfully scaled Mt. Yule, the top of which was reached on Christmas-day. The expedition, the cost of which was borne by the Victorian Branch of the Royal Geographical Society of Australasia, was under the auspices of the Government of British New Guinea, his Honour Sir W. Macgregor, Administrator, having personally directed its organisation and equipment, besides having accompanied the party to the St. Joseph District. Sir William also appointed one of his officials, Mr. George Belford, to the command of the expedition. Mr. Belford, it will be remembered, accompanied Sir William Macgregor on his famous expedition to the summit of the Owen Stanley Range, and shared with him the perils of that most notable feat of scaling the culminating peaks of Mt. Victoria. In crossing dangerous places on the Vanapa River, and on several other occasions, Mr. Belford's ready resources and untiring energy on that memorable expedition won the cordial appreciation of his leader.

"The Kovio Range overlooks Hall Sound and the district of Motu Motu, between Port Moresby and the Aird River, and the appearance of Mt. Yule from several different positions has given rise to the supposition that it is the culminating peak

of that range, but the observations of this expedition show that Mt. Yule is an isolated mass, rearing its majestic crown skywards from the lowlands of the St. Joseph District, the exhalations from which, accumulating in dense masses, daily enshroud its summit in obscurity. That the most prominent physical feature of the district is thus isolated may probably be explained by the geological character of the country, which the expedition pronounced to be volcanic. During the hour spent by the expedition on the summit of Mt. Yule a rather large sheet of water was observed below, but no data have as yet been received to define its position. The geological character of a part of the country traversed appeared to be schistose, and traces of gold were observed. A forest mantle clothes the Kovio Range to its very summit, and native paths traverse its rugged sides and ridge, connecting the numerous villages which are scattered over the range, its outliers, and the adjoining lowlands. These and other signs indicate the occupation of this region by a moderately dense population of natives. Being fully occupied in obtaining information concerning the physical features of the country, Mr. Belford made no attempts to open up relations with the Papuans. During the progress of the expedition very wet weather was experienced, and few forms of animal life were met with. Considering how short a time was spent on the summit of Mt. Yule, it is probable that the geographical data collected are not very numerous."

Central Australia.—The expedition equipped at the expense of Sir Thomas Elder was to start from the Peake on April 30th. The arrangements have been left in the hands of the Council of the Royal Society of Australasia (Victorian Branch). Being unrestricted in their expenditure, they have been able to send out an expedition unsurpassed by any that has hitherto gone forth to explore the Australian Continent. Its object is to make a scientific exploration of the vast unknown areas lying between the parallels of 15° and 30° S. lat., and to search for information about the lost explorer, Leichhardt. Starting from the Peake with provisions for six months, carried on camels, the party will march to the Everard Ranges, and then proceed westwards into the unexplored territory lying between the routes of Forrest and Giles. On arriving at the Murchison River, a fresh supply of stores will be taken up, and the party will advance, in a north-easterly direction, to the Margaret River in the Kimberley District, where a second depôt will be formed. The third stores depôt will be at Tennant's Creek, on the telegraph line. The further course of the expedition is not definitely settled, but the leader has instructions, unless anything unforeseen occurs, to return by a south-easterly route through the unmapped country to the east of the telegraph line. It is here that some traces of Leichhardt may possibly be found, for his route has been reliably tracked out to a point at about 23° 30′ S. lat. and 134° E. long. A *Handbook of Instructions for the Guidance of Officers of the Elder Scientific Exploration Expedition* has been issued by the Council of the South Australian Branch of the Royal Geographical Society of Australasia, containing full directions for the collection and preservation of botanical and zoological specimens, taking meteorological observations, etc. The leader of the expedition is Mr. D. Lindsay, who has already gained a reputation as an explorer in Arnhem Land and elsewhere. He will be accompanied by Mr. F. W. Leech, also an experienced traveller; by Dr. Elliott, in the capacities of surgeon and botanist; by Mr. Streich as geologist, ethnologist, and meteorologist; by Mr. Helms as naturalist, and by four assistants.—*The Australian Register* April 22 and April 27.

Flores.—Prof. A. Wichmann has contributed an article to the *Tijdschrift van het Kon. Nederl. Aardrijksgenootschap*, Deel viii., No. 2, describing the exploration of Flores, which he undertook in company with Professor Weber. From Celebes

the travellers sailed in the *Sperwer* to Bima, in the island of Sumbawa, for the Sultan of that district is also the ruler of Mangarai, as the western part of Flores is called, and it was necessary to obtain a pass from the Sultan before landing in that country. Sailing along the desolate north coast of Sumbawa, Professor Wichmann arrived at Bari in Mangarai on the morning of November 26th, 1888. The bay of Bari is bounded on the west by steep limestone rocks, and its southern shore is clothed with luxuriant vegetation almost to the water's edge. Professors Wichmann and Weber landed, and, passing through a miserable village of about twelve huts, ascended, under the guidance of the head-man, the valley of the Bari River. It is a few furlongs broad, and is enclosed between limestone ridges, 600 to 1000 feet high. The stones in the river-bed are principally of limestone, but felspar and and augite-andesite are also found, and even porphyritic quartz, argillaceous slate, and quartzite. Further up the valley the path led through forest containing a large quantity of *Canarium commune*, where extensive clearings afford pasturage for a few horses. Continuing his voyage along the coast, Professor Wichmann found that its background is formed of two or three chains of limestone rising one behind the other, while by the shore lies a later formation of andesite conglomerate. After four hours' sail the vessel entered the bay of Reo, three miles broad, lying between the capes, Tanjong Bessi on the west and Tanjong Kadinging on the east. Here also the explorers made excursions into the country, finding much the same geological formations and also coralline limestone. From Reo Albert Colfs, in 1880, crossed the island to the south coast. He is the only European who has undertaken such an expedition. Professor Wichmann visited Tanjong Bessi (Iron Cape). Its shore is flat and partly covered with *Rhizophora*. Blocks of andesite are scattered on the beach and fragments of pumice stone, carried from Krakatau by the great eruption. A coral reef skirts the shore. The next place visited was the island of Paloveh, or Rusa Raja, which consists of a single mountain-ridge with a summit full 2600 feet in height. The slopes are clothed principally with the *Lontar* palm (*Borassus flabelliformis*), while here and there appear a few coco palms. The Papuan inhabitants live in fortified villages of low huts, to which the pigs and goats are freely admitted. Their clothing is very scanty, but they seem to attach great value to ornaments—coils of copper wire on arms and legs, brass rings and chains round the neck and in the ears. Water is very scarce in the dry season. Passing within sight of another island, Rusa Linguette, smaller and much lower than Rusa Raja, the *Sperwer* entered the Bay of Geliting, and anchored opposite the village of Maumeri, the residence of a Dutch agent and the site of a Catholic Mission. The scenery at this spot is very different from the bay of Reo. There are no wooded rocks along the shore, and the coralline limestone and underlying conglomerate are absent. The land rises in smooth slopes to a row of volcanic peaks in the background, among them the Gunong Egong, which is still active, and the Gunong Kokker, the highest of the group. On the morning of Nov. 30th the *Sperwer* weighed anchor for Makassar, and the explorers transferred their quarters to the house of the government agent. The river Maumeri is crossed by a wooden bridge, the only one in the whole island, but during the east monsoon it is never used, for the bed of the river is then dry. About $4\frac{1}{2}$ miles to the east of Maumeri lies Geliting, a Buginese settlement and the most important mart on the north coast of the island. Formerly the people of Maumeri competed with the Mohammedans of Geliting in the trade with Makassar, but now the trade of the former village has almost vanished, the Papuans being far inferior to the Malays both as merchants and sailors. At Geliting Professor Wichmann saw some of the hill people, who had brought cotton, tobacco, pineapples, and tamarinds to barter for cotton fabrics and other goods. They were finely built men, clothed

only with a loin-cloth, and wearing a long narrow comb in their immense bushes of hair.

With great difficulty the explorers obtained porters, and set out to cross to the southern coast of the island, 12 or 13 miles distant. Crossing the bed of the Maumeri river eleven times, the party ascended over ground covered by dry *Alang-alang*, low bushes and numerous *Lontar* palms to the village of Kotti, situated on the saddle at an elevation of 836 feet. It is shaded by a quantity of fine *Kanari* trees, a favourite haunt of noisy cockatoos. The houses are large and well-built, but, as in most of the hill villages, the scarcity of water is sorely felt. After a rest at this village, the party continued on its way through forest interspersed with coco palm plantations and maize fields, then across the rocky gorge through which the Batik Vayer finds its way to the south coast, and from a ridge 840 feet high obtained a beautiful view of the broad bay of Paga. In the afternoon they arrived at Sikka, and were hospitably received by the missionary and the Raja. Sikka lies on a flat promontory, having a low ridge running east and west along its base. From the shore a coral reef runs far out into the sea. A borer sunk in a hole near the church struck into stratified tuff at a depth of 23 feet, and below that into sea-sand containing abundant remains of marine organisms identical with those now existing in the neighbouring waters. The coast to the west is formed by ridges radiating from the mountain Ilingneva, and is composed of pumice tuff covered with andesite conglomerate. Having procured a *prauw*, Professors Wichmann and Weber rowed along the coast to Endeh. The peninsula of Endeh terminates in the volcano Gunong Iya, which continually vomits forth smoke and vapour. The village of Endeh, situated on the western side of the peninsula, consists of thirty enclosures. The inhabitants, originally Makassarese and Buginese, have intermarried with native tribes, and have retained the bad characteristics of both races. The village is remarkably dirty; for pigs, which act as scavengers in Papuan villages, are not kept by the Endinese Mohammedans. Agriculture, confined almost entirely to the cultivation of maize, is carried on by slaves, while female slaves are employed in the weaving of cotton. The village has a certain degree of importance as the largest commercial centre in Flores, but the trade is in the hands of only a few individuals, and is of no great value. European goods are imported from Singapore, and rice from the island of Bali. While Professor Weber paid a visit to Braai, Professor Wichmann ascended G. Puï, a volcano on the eastern side of the peninsula, separated from G. Iya by the ridge G. Ruja. It rises to a height of 1330 feet, and its crater, 250 yards in diameter, is used as garden ground. Pineapples, bananas, and a few miserable *Lontar* palms grow round the edge, and beans and manioc are planted in the hollow. The most westerly points on the southern coast visited by the travellers were the mouth of the Nanga Bakeh, at the foot of the G. Keo, and the village of Bombang at the foot of G. Voropau, 3300 feet high. The natives were dressed in blue loin-cloths and sleeveless jackets, and were armed with all kinds of weapons. They trade a little in maize, raw cotton, and dirty yellow beads called *Muti-tanah*, which are highly prized in Timor and the adjacent islands. From Bombang the explorers retraced their steps to Sikka and Maumeri, where Professor Weber took ship for Makassar, while Professor Wichmann, in a *prauw* lent him by the missionary at Maumeri, skirted the northern coast eastwards, passing through the channel, about 1½ miles wide, which separates the Great and Little Bastard Islands. He landed in the Bay of Hadding, which is sheltered on the north-west by a peninsula, while to the east rise several mountains, culminating in the summit of Ilimandiri, 5180 feet high. The strand is covered with coco palms and a considerable number of areca palms. After crossing the narrow zone of forest, Professor Wichmann

ascended a valley between G. Delang and G. Ilipadung, where shrubs of *Alang-alang* grew among boulders of andesite, and, after three-quarters of an hour's march reached the watershed at an elevation of 740 feet. The southern slope, towards the bay of Okka, is open, even country, where maize and rice fields flourish. At Okka a despatch-boat was waiting to carry Professor Wichmann to Posto, at the narrowest point of the Flores Strait, here only 1½ miles broad. Numerous villages lie on the strip of ground between the slopes of Ilimandiri and the sea, which is so small that most of the native gardens lie in Adonara on the other side of the strait. On this island and the adjacent Solor stand several volcanoes, some extinct and others still in a state of activity. After spending some days in the exploration of these islands, Dr. Wichmann returned to the despatch-boat, and sailed for Timor, passing through the Lobetobi Strait between Flores and Solor. The peninsula on the Flores side is entirely occupied by Lobetobi, the largest mountain-mass on the island. Its chief cone, Lakilaki, rises to a height of 7420 feet.

Dr. Wichmann's article contains a bibliography of the island and a table of geographical positions, and is accompanied by a map and several illustrations.

COMMERCIAL GEOGRAPHY.

The Nijni Novgorod Fair.—The French Consul-General at Moscow states that the value of the goods brought to this fair in 1890 was 181,256,000 roubles (about £17,370,000). In 1889 the value was greater by about £558,800. The sales amounted to about £16,696,000, and were also less than in the preceding year. The presence of Afghan merchants at the fair last year shows that Russian commerce is extending in the East.—*Chamber of Commerce Journal*, April 10th.

Iron and Coal in South Russia.—Captain Talbot, British Consul at Taganrog, has lately issued a report upon the iron and coal industries of South Russia, from which the following particulars are taken. The Donetz basin yields an annually increasing amount of iron, and three new blast furnaces have just been added to the already extensive works in that district, and rolling mills have also been built to meet the larger demands upon the companies engaged in working the ore. New works are being pushed on at Krivoi Rog and at Constantinovka, where no manufactories previously existed. This activity Captain Turner attributes to the protective duties lately imposed on foreign iron, causing the trade of St. Petersburg, which was formerly entirely supplied with iron from abroad, to look out for markets and mines within the Russian borders. The high railway and transport rates have had a depressing influence on the new industry, but a Government inquiry, now proceeding, is expected to remedy this unfavourable aspect of the trade. So popular has the iron become in South Russia that the supplies from the Urals have now almost ceased to come into that part of the country. The coal exported from the Donetz basin has fallen off in quantity to the extent of 137,535 tons, but the consumption is believed to keep steady. This coal is now largely shipped from Mariupol to the Black Sea ports. Here, also, the influence of the protective duties has been felt, the fall in the imports of English coal into Russia being estimated at 100,000 tons in the year.

Novorossisk.—This town, which ten years ago contained only 2000 inhabitants, has made enormous strides, owing in great measure to the naphtha springs near Stanitza Ilskaia, about 50 miles up the country. It has now a population of 10,000, and in 1890 exported goods to the value of more than two and a half millions sterling. Coal and metals are to be found in the neighbouring mountains. The branch from the Rostov-Vladikavkaz railway was completed in 1888, and the

harbour of Novorossisk is to be improved.—*Chamber of Commerce Journal*, April 10th.

The Karun River.—Mohammerah, which was till recently an unimportant town, has now become a thriving port, at which the steamers of the British India Company and the Bombay and Persian Gulf Company call regularly. Steamers run up the river to Ahwaz, and from Ahwaz to Shuster, and a telegraph line has been laid from Dizful to Ahwaz. There are still some difficulties to overcome. The landing-stage at Mohammerah is too far from low-water mark to be of much service, the work of the Customs Department is not yet fully organised, and the telegraph communication with Teheran is seldom perfect; but it is expected that these hindrances to trade will be easily removed. Corn is shipped to Europe, and much greater quantities could be grown in the Karun district than at present. Oil-seed, flax, and roses are also cultivated, rose-water being manufactured on the island of Khedr. The principal industries at Mohammerah are dyeing, tanning, and working in silver.—*The Times*, May 20th.

Mexican Railways.—It was only in 1864 that the Government decreed the construction of the first railway in Mexico, that running from Vera Cruz to the capital. At the end of 1889 the lines in working order had a total length of 5056 miles, and the lines projected a length of 7446. When these are completed, Mexico will possess one mile of railway for every square mile of surface and for every 525 inhabitants. Unfortunately all the lines, except that from Vera Cruz to Mexico, are badly constructed, and several of the most important are of narrow gauge. Scarcity of coal and wood make the working expenses very heavy.—*Bull. de la Soc. Roy. Belge de Géog.*, No. 2, 1891.

The Mineral Riches of New Caledonia.—The *Chamber of Commerce Journal*, April 10th, gives an account of the mining industry in New Caledonia. On 1st January 1890 there existed 115 nickel mines, occupying an area of 27,473 square miles, 22 of which produced, in 1889, 19,741 tons of ore, containing seven to ten per cent. of pure nickel. Chrome iron is also extracted, the most important deposits being found in the vicinity of the rivers N'Go and Pirogues, from which 2254 tons of ore were exported in 1889. The proportion of sesquioxide of chrome contained in the ore was, on the average, 50 per cent. Gold was formerly worked and copper, whilst valuable deposits of the latter are known to exist. Argentiferous lead has been worked, yielding 30 per cent. of lead and one to two pounds of silver per ton of ore. Iron ore is the most abundant of all, but it is doubtful whether it can be profitably worked. Many other minerals, such as mercury, tin, platinum, manganese, etc., also exist, but have not been worked up to the present. A recent geological map shows an area of nearly two million acres of mining lands at present unexplored.

MISCELLANEOUS.

Another **Russian Scientific Expedition**, under Captain Bartchefsky, has left Samarkand for the Pamir and Kafiristan.—*Le Mouvement Géogr.*, May 31st.

Dr. Schweinfurth has returned from Abyssinia, bringing with him a valuable botanical collection.

M. Venukoff has announced to the Paris Geog. Soc. (*Compte Rendu*, No. 12, 1891) that another expedition for the **Investigation of the Black Sea** has set out under the same leaders, MM. Spindler, Andrussof, and Wrangell.

The **Population of Ceylon**, as shown by the late census, is 3,008,239. The

increase in the last ten years is 244,225, or 8·8 per cent.—*The Colonies and India*, July 4th.

The exports of **Petroleum** and petroleum products from the **United States** amounted in 1890 to 689,029,966 gallons, of the value of $51,656,677. In 1889 the quantity was 675,938,540 gallons, and the value $52,793,241.—*The Times*, July 1st.

M. Ch. Faure, late secretary of the Geographical Society of Geneva, has sent us an **Exposé sommaire des Voyages et Travaux géographiques des Suisses dans le cours du xix^e^ siècle**, compiled for the Congrés international des Sciences géographiques held at Paris in 1889.

Dr. Hans Schinz has been charged by the German Government to conduct an expedition from **Cameroons to Baghirmi**, with the hope of recovering the ground lost by the defeat of Dr. Zintgraff, a third of whose men were killed in a battle with the Barfut, in January last.—*Revue Française*, June 15th.

In June last the water of the Mersey was admitted into the section of the **Manchester Ship Canal** which extends from Ellesmere Port to Eastham. This section is about four miles long by 170 feet wide and 26 feet deep.—*The Times*, June 20th.

As a consequence of the opening of the Song-ca, or **Red River of Tong-king**, Yunnan tin has almost vanished from the port of Pakhoi, and the British Consul at that port declares that, before long, the whole import and export trade of Western Kwang-si and Yunnan will follow the new route.—*The Times*, May 21st, 1891.

The Tsar of Russia has given his decision on the **Franco-Dutch Frontier Question in Guiana** (*vide S. G. M.*, vol. iv. p. 664). The river Aua, or Lawa, is declared to be the boundary between the Dutch and French possessions. The effect of this decision will be to hand over the *Hinterland* of about one-fourth of the littoral of French Guiana to the Netherlands.—*Revue Française*, June 15th.

M. V. T. Mashkoff started with an **Expedition for Abyssinia** at the beginning of April. Travelling by way of Port Said, Aden, and Obock, the expedition will commence its overland journey at Ras Jebuti. Three years, it is stated, will be spent in the investigation of the religions, history, ethnography, fauna, and flora of the country.—*Boll. della Soc. Geog. Italiana*, vol. iv. fasc. v.

On page 162 of this volume it was stated that **Boundary Cape, New Guinea**, was so named by Sir Peter Scratchley. Mr. H. O. Forbes writes to say that he gave the name to the cape, and, in support of his statement, refers to a memorandum of his own in a *Report on British New Guinea*, compiled by Mr. G. Seymour, Sir Peter Scratchley's private secretary. This report will be found among the Victorian *Parliamentary Papers* for 1886. Mr. Forbes thinks it probable also that the first and deepest of the indentations to the south of the cape, named by him Annabel Harbour, is identical with Sir W. Macgregor's Douglas Harbour.

We have received from our Hon. Corr. Member, M. Venukoff, the first volume of a **Bibliography of Asia**, compiled by M. Méjoff, and published by the General Staff of the Russian Army. The 5197 books and articles catalogued are, most of them, in Russian, but a few in other languages, bearing on Russian relations with the Asiatic governments, are incorporated. The subjects of these works are various, including religion, history, geography and ethnology, language and literature, etc. The second volume will deal with Finnish, Tatar, Mongolian, and other literary productions of the Russian Empire. At the same time has been issued the first volume of a *Bibliography of Siberia*, publications dealing with this territory not being included in the work of M. Méjoff.

NEW BOOKS.

Life of Sir John Franklin; and the North-West Passage. By Captain Albert Hastings Markham, R.N., A.D.C. "Explorers' Series." London: George Philip and Son. 1891. Pp. 324. Maps and Illustrations. *Price* 4*s.* 6*d.*

The main object of this valuable series is admirably fulfilled in the volume before us: to associate with some era in geographical discovery the name of its most prominent pioneer. Sir John Franklin has always enjoyed the credit of being the actual discoverer of the North-West Passage, towards which he devoted the best years of his life. His overland journeys in Arctic America contributed largely to the discovery of the North-West Passage; but, on his last journey, in command of the *Erebus* and *Terror*, he died on the threshold of his goal. It was no less due to the relief expeditions sent out in search of the ill-fated Franklin Expedition, and especially to the *Investigator*, under Captain M'Clure, that this long-vexed problem was satisfactorily solved.

The *Life of Sir John Franklin*, towards the construction of which the materials are both scanty and scattered, is sketched with a sympathetic and masterly hand by Captain Markham—himself an Arctic voyager of merit. The incidents in the exploration of the North-West Passage and of the Arctic Regions in general are interwoven in the thread of the narrative, and, though necessarily eclectic, are treated with judgment and skill. Franklin's adventurous career is given in considerable detail. We find him entering the navy at an early age and fighting his country's battles at Copenhagen and Trafalgar. He accompanied Flinders on the ill-fated but by no means unsuccessful voyage of discovery to Australia, on the occasion of which his own scientific predilections received definite shape and were trained in a good school. As Captain Buchan's lieutenant he commanded the *Trent* on his first voyage to the Arctic Regions and the first of this century despatched in search of the North-West Passage. Then followed his two overland journeys, in the first of which he traversed over five thousand miles by land and sea, and in the second discovered and accurately delineated "over a thousand miles of the north coast of the American Continent, hitherto absolutely unknown," besides contributing other scientific results of importance. On his return home he was duly honoured. His subsequent experiences in the Mediterranean, where he commanded the *Rainbow* during the disturbances on the coast of Greece, and as Governor of Van Diemen's Land for six and a-half years, were in striking contrast to his Arctic life. Finally, Franklin's last journey, from which he and his companions never returned, is dealt with in considerable detail.

We have practically nothing to say by way of criticism. Here and there—*e.g.*, in the references to the Greely expedition—we might feel disposed to carp at a few expressions of judgment, but in the difficult task of appreciating the relative merit of explorers some latitude must be allowed an author. Dr. Rae, for instance, has called public attention to what he regards as an oversight in Captain Markham's narrative, and has requested us to remedy it. On page 199 the author does undoubtedly overlook Dr. Rae's claims to the prior exploration of Wollaston Land, which he ascribes to Dease and Simpson; but Dr. Rae, who has been well treated otherwise, might have been satisfied with the reference—if, perhaps, he has seen it—on page 244: "Dr. Rae was also employed in exploring the neighbourhood of the Coppermine River and the shores of Wollaston and Victoria Land." Captain Markham could not be expected to deal comprehensively with such a vast subject as that of Arctic exploration, but his *bona fides* cannot be impugned, and his extreme modesty may be discerned from the fact that he does not even allude to

himself as having led the notable sledge-journey across the Palæocrystic Sea, when the highest latitude was attained and has only since been surpassed by "Lockwood's Furthest."

The maps and illustrations to the volume are admirable in every respect.

Viscount Hardinge (*Rulers of India*). By his Son and Private Secretary in India, Charles Viscount Hardinge, B.A. Oxford: at the Clarendon Press, 1891. *Price* 2*s.* 6*d.*

The present Lord Hardinge has produced a delightful biography and a noble memorial of his distinguished father. No purer character nor worthier military statesman ever governed India. For the first time the story of his nearly four years' administration is here placed on popular record. The biographer saw, himself, a part of the great events he describes, and, as the Governor-General's Secretary, he here contributes much that is at once new and honourable to the history of the first Sikh War and of the political arrangements that followed it. After all, the first Lord Hardinge's highest title to honour is this, that Sir Henry Lawrence served him with affection, and John Lawrence with loyalty, while he won the devotion of the greatest soldiers and politicians of his day—of George Broadfoot, the four Abbotts, the Bechers, Lake, Reynell Taylor, R. Napier, Herbert Edwardes, Currie, and Elliot, R.N. Cust alone still survives of the band who began the brightest triumph of British rule—the conquest and administration of the Punjab—nearly half-a-century ago. We are disarmed from criticising the political part of the book, but may state that only military reasons are assigned for the sale of Kashmir to Ghulab Singh and the non-annexation of Lahore at that time.

Natural Selection and Tropical Nature: Essays on Descriptive and Theoretical Biology. By Alfred Russel Wallace. New Edition, with Corrections and Additions. London: Macmillan and Co., 1891. *Price* 6*s.*

This volume is merely a reprint of *Natural Selection*, which appeared in 1870, and *Tropical Nature*, the first edition of which was published in 1878, with several corrections and additions and two new chapters on *The Antiquity of Man in North America* and *The Debt of Science to Darwin*. It is now more than forty years since the author accompanied Mr. Bates to the Amazons, and became known as an indefatigable traveller and close observer, by his first published book, *Travels on the Amazon and Rio Negro*. Many important scientific works by the same author have since then appeared from time to time, but the one which was received with greatest interest by the scientific world was his famous essay on *Natural Selection*. This theory, the independent discovery of Dr. Wallace, was fully recognised by Darwin, and was probably what induced the latter author to prepare for publication his great work on the *Origin of Species*. The present volume contains a reprint of the essay, but the best elucidation of the theory is contained in a work published in 1882 under the title of *Darwinism*. The second part of the volume contains some delightful chapters on Tropical nature, on the climate of the Equatorial zone, and the vegetation and animal life of the Tropical forests. In one of the concluding chapters the various discoveries and researches as to the antiquity of man in North America are reviewed, including the recent discoveries in the Tertiary gravels of Crow Creek, Colorado, and the auriferous gravels of the Pacific slope. In the last chapter a tribute is paid to the genius of Darwin and the life-long labours of that unequalled student of Nature.

A Girl in the Karpathians. By Ménie Muriel Dowie. London : George Philip and Son, 1891. Pp. 309. *Price* 7*s.* 6*d.*

Miss Dowie has the courage of her convictions. Having charmed the *savants* of the British Association last year with a brief account of her experiences in the Carpathians (Miss Dowie will permit us to retain this old-fashioned spelling, we hope), she now appeals, in regular book-form, to the suffrages of a wider public. That this appeal will be indulgently received we have no doubt. The "censorious world" will find much to criticise in her pages : passages that never would have been missed—which, indeed, detract from the charm of her narrative, and are sometimes even vulgar. But Miss Dowie is nothing if she be not original and outspoken, and she affects a surprising indifference to public opinion. One might even question the necessity of adopting a youth's dress, when so many compromises are feasible : but none can gainsay that, from the picturesque point of view, her costume, no less than her independent mode of travelling, add greatly to the piquant character of her experiences. Although she wandered in parts of the Carpathians that are perfectly well known to the travelling public of Austria-Hungary and Germany, she occasionally struck away from the beaten track, and ventured on an excursion. But for the most part she lived an idyllic life among the villagers, and thus gained an insight into their lives, which is impossible to the average tourist. She followed with sympathy their daily routine, without being "one of them," for more often we find her wandering alone, far a-field, and musing on life-problems in a manner peculiarly her own. Her narrative, if we except the blemishes already referred to, is fresh and unconstrained, and is sure to captivate the reader.

The map shows the gradual dismemberment of Poland, from early historic times, but its interest is independent of the book and might with advantage have been replaced by a simple tourist-map.

Russia and the Jews : A brief Sketch of Russian History and the Condition of its Jewish Subjects. By A. Reader, M.A. London : Digby and Long, n.d. Pp. 96. *Price* 1*s.*

To those readers who have not time to study the voluminous works on Russia written by Hepworth Dixon and Mackenzie Wallace this little book of short essays will be of considerable service. The author has gleaned useful materials from these and other reliable writers, and states clearly and plainly, without apparent exaggeration, the hardships to which "the chosen race" are subjected in the Tsar's dominions.

The Russian Government, in dealing with the Jewish Question, would seem to be actuated entirely by motives of self-interest, the amelioration of their weaker brethren occupying but a minor place in their policy.

Imperial Germany : A Critical Study of Fact and Character. By Sidney Whitman. Popular Edition. London : William Heinemann, 1891. Pp. 304. *Price* 2*s.*

The publisher has acted wisely, we think, in endeavouring to popularise, in a cheap and handy form, such an intelligent record of personal observation of the qualities, admirable and otherwise, of the German nation, as that lately written by Mr. Whitman. This edition is clearly printed, and the careful subdivision of each chapter into sections adds pleasure to the profit derived from a perusal of the author's lucid statements.

With Gordon in China. Letters from THOMAS LYSTER, Lieutenant, Royal Engineers. With portrait. Edited by E. A. LYSTER. London: T. Fisher Unwin, 1891. *Price* 6*s.*

Anything relating to "Chinese Gordon" is still received with interest by readers in this country; and the writer of these letters, having served with him for three years in China, is enabled to add a few particulars to the already published accounts of Gordon's career. Lieut. Lyster was employed by Gordon to survey the country around Shanghai, when the Taiping rebellion was at its height and the rebels were in the vicinity of that city. He gives an account of several engagements with the rebels and the aspect of the country after the devastating march of these ruffians. The letters are mostly written to relatives at home, and give the writer's first impressions of China and Japan.

Tahiti: The Garden of the Pacific. By DORA HORT. London: T. Fisher Unwin, 1891. Pp. 352. *Price* 10*s.* 6*d.*

When the first feeling of disappointment is over—disappointment that Mrs. Hort's Tahiti is not the island of to-day but of well-nigh a generation ago—the reader must be indeed difficult to please who cannot enjoy and profit by a perusal of a very interesting narrative. Not that any very important events or wonderful adventures are recorded, but the scenes of every-day domestic life are recounted with charming freshness, and the glimpses given us of Queen Pomare's court and conduct are alike novel and fascinating. Mrs. Hort has opinions of her own, and does not hesitate to make them known; her very frank style of discussing individuals and events is as uncommon as it is amusing, and may, perhaps, account, in some measure at least, for the delay in publishing the narrative. The authoress does not appear to have been on friendly terms with many of the French authorities who governed when she resided in Tahiti, and this, probably, is the reason why the French rule and the manners and customs of the officials come in for their fair share of not very complimentary notice. We are inclined to think that the authoress has, unconsciously and in all good faith, meted out but scant justice to people whose manner of conducting affairs and whose code of morals were widely different from her own, and who, doubtless, in the main, did their best according to their light. We have, in addition to the description of Tahiti, lively accounts of journeys to Australia and to Chile, the whole forming as fresh and pleasant a record of life in a strange land as any we have met with for some time.

The book is excellently printed on good paper, and is embellished with portraits of Queen Pomare and her husband Ariifaiti, but there is neither map nor index.

Ivory, Apes, and Peacocks: An African Contemplation. By the Rev. HORACE WALLER. London: Edward Stanford, 1891. Pp. 90. *Price* 2*s.*

This is a homily on Africa. Taking recent events as his text, Mr. Waller discourses, in a manner and a style peculiarly his own, on some of the glaring iniquities and inconsistencies arising from European action in Africa. His motive being a good one (that of protecting the Native against his unscrupulous task-master), it somewhat disarms our criticism. But Mr. Waller criticises either from imperfect or utterly one-sided data. If he were to weigh his evidence a little more carefully, and write temperately, his remarks would be more likely to attract attention; for, after all, he has devoted much time and thought to African subjects. As it is, however, we accept his treatise as a "contemplation" only.

British Difficulties under Solution. By Frederick Richard Hungerford. London: Cassell and Co., n.d. Pp. 124.

The title of this booklet is misleading: it should have been "Australian" difficulties under solution, for it concerns itself almost exclusively with the condition of Australian markets. The author wishes Britain to come to her help in the matters of food-supply and labour. His book is well worth reading, being clearly and forcibly written, if somewhat pessimistic in tone. The solution of his "difficulties" rests, we fear, with Australia alone.

The Natal Almanac, Directory, and Yearly Register, 1891. Davis and Sons, Pietermaritzburg; Street and Co., London. Pp. 632. Directory, pp. 151.

This is a most useful manual, and is replete with information with regard to Natal. It must be almost indispensable to any resident there, and, owing to the statistical information it contains with regard to population, agriculture, gold-fields, tariffs, etc., it will be found of service to any one requiring details respecting the Colony. The volume contains a diary for the year, but a map would have greatly added to its value.

Swiss Pictures. Illustrated. Map. London: Religious Tract Society, 1891. Pp. 216. *Price* 8*s.*

This is a new edition, revised and partly re-written, of a volume that has already been favourably noticed. There are several additional illustrations by Edward Whymper.

Both text and illustrations convey a vivid impression of the beautiful scenery of Switzerland, and should be appreciated not only by those to whom the country is unknown, but also by those to whom it is familiar.

Climber's Guide to the Eastern Pennine Alps. By William Martin Conway. London: T. Fisher Unwin, 1891. Pp. 152. *Price* 10*s.*

A practical and business-like pocket guide for the use of climbers. It is neatly and strongly bound, but its high price—owing to the limited edition of four hundred copies—is somewhat prohibitive. Mr. Conway is himself a climber, and his sources of information are unique; but many of the instructions appear to us to be somewhat scrappy, except for a professional guide or merely as a rough indication to the amateur. The little volume should be appreciated by those for whom it is intended.

Border Abbeys and Abbotsford (Immortalised by the Genius of Sir Walter Scott, Bart.). By Donald Macleod. Edinburgh and Glasgow: John Menzies and Co., n.d. Pp. xix. + 124. Illustrated.

This is a collection of short essays, written in a somewhat poetic strain and with a redundancy of expression evidently intended to ensure that full justice should be done to the beauties of nature and art visited by the author during his rambles. The subjects, such as Roslin, Melrose, Abbotsford, Dryburgh, etc., are full of interest, and Mr. Macleod has gathered much useful information regarding them. This he might have imparted more clearly had he been careful to avoid sentimentalism. The book is supplied with a number of familiar illustrations, but a closer revision would have freed it from many typographical errors.

I. DIAGRAM SHOWING THE PE

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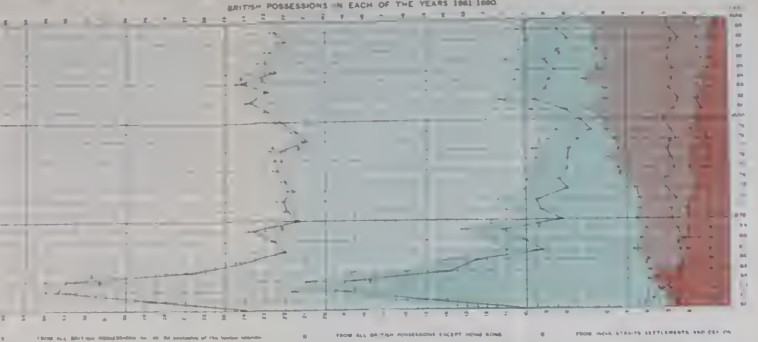
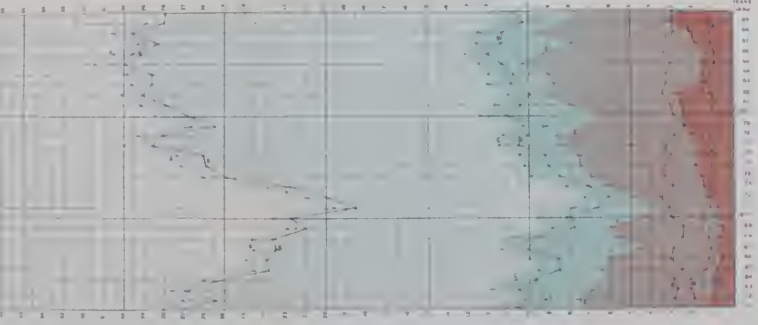
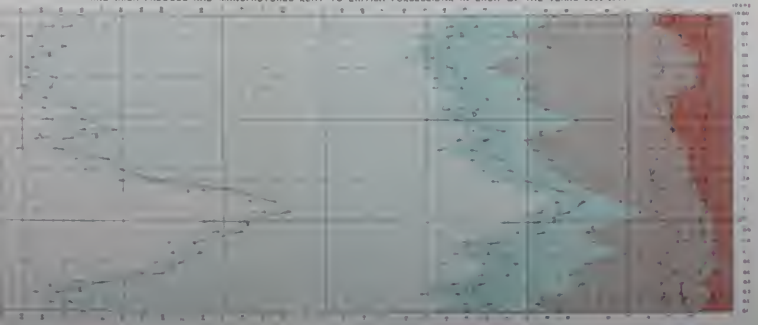
DIAGRAM SHOWING THE PERCENTAGE OF THE IMPORTS OF THE UNITED KINGDOM DERIVED FROM BRITISH POSSESSIONS IN EACH OF THE YEARS 1861-1880



II DIAGRAM SHOWING THE PERCENTAGE OF THE GROSS EXPORTS OF THE UNITED KINGDOM SENT TO BRITISH POSSESSIONS IN EACH OF THE YEARS 1861-1880

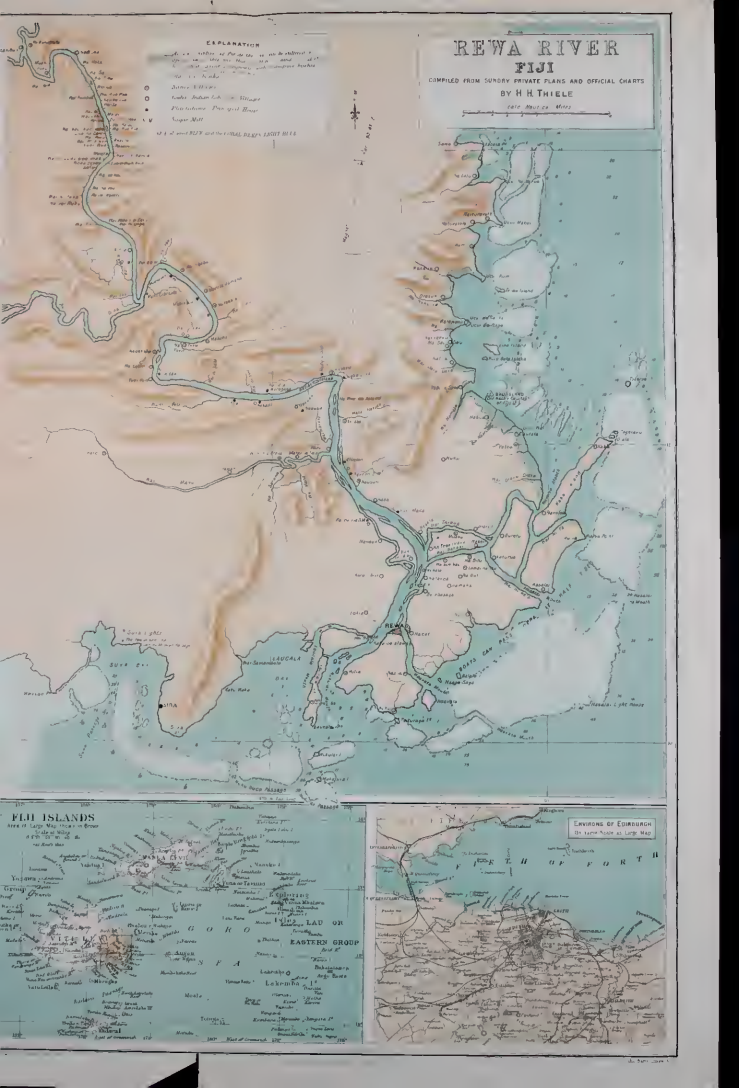


III DIAGRAM SHOWING THE PERCENTAGE OF THE EXPORTS FROM THE UNITED KINGDOM OF BRITISH AND IRISH PRODUCE AND MANUFACTURES SENT TO BRITISH POSSESSIONS IN EACH OF THE YEARS 1861-1880



The Edin

John Bartholomew &


REWA RIVER
FIJI
COMPILED FROM SUNDRY PRIVATE PLANS AND OFFICIAL CHARTS
BY H. H. THIELE
Scale Nautical Miles
EXPLANATION
REWA
LAUCALA
FIJI ISLANDS
Area in Large Map in Green
EASTERN GROUP
VITI LEVU
VANUA LEVU
ENVIRONS OF EDINBURGH
On same Scale as Large Map
FIRTH OF FORTH

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

BRITANNIC CONFEDERATION.

IV.—TARIFFS, AND INTERNATIONAL COMMERCE.

By Professor Shield Nicholson.

"To expect," wrote Adam Smith, "that the freedom of trade should ever be entirely restored in Great Britain is as absurd as to expect that an Oceana or Utopia should ever be established in it. Not only the prejudices of the public, but, what is much more unconquerable, the private interests of many individuals, irresistibly oppose it."[1] This curious example of the danger of political prophecy should suffice to dispel the apathy generally displayed towards any consideration of the fiscal aspects of Britannic Confederation. It is surely absurd, in the light of the history of the United Kingdom during the present century, to put aside proposals for a closer commercial union with the colonies and dependencies on the ground either of the prejudices of the public or of the private interests of individuals. Yet nothing is more common than to speak of the complicated tariffs and the vested interests of the newest colonies as insuperable obstacles to any general fiscal reform. As a matter of historical fact, however, in much less than a century the commercial policy of the British Empire has passed, speaking broadly, from the extreme of central regulation to the extreme of non-interference, and there is, *prima facie*, no reason why a reaction should not occur if such a course is shown to be to the mutual advantage of the colonies and the mother-country.

The Declaration of American Independence and the publication of the *Wealth of Nations* were by far the most important events of the year 1776. Up to this time the monopoly of the colonial trade was regarded as one of the principal engines of the mercantile system. Most of the

[1] *Wealth of Nations*, bk. iv. ch. ii. p. 207, M'Culloch's edition.

great wars of the 18th century, as Professor Seeley [1] (following Adam Smith) has so well shown, originated in a struggle for trade supremacy in new countries—and trade supremacy really meant monopoly. The British colonies, which were allowed comparatively the greatest freedom, were still placed under very stringent regulations both as regards their exports and imports.[2] Certain colonial commodities were *enumerated* in various Acts of Parliament, and could only be exported to the home country, whilst even non-enumerated products were subject to restrictions of various kinds. But the height of regulation and monopoly was reached in the case of manufactures. "The more advanced or more refined manufactures even of the colony produce, the merchants and manufacturers of Great Britain choose to reserve to themselves, and have prevailed upon the legislature to prevent their establishment in the colonies sometimes by high duties and sometimes by absolute prohibitions."[3] To enforce this policy many curious restrictions were imposed upon the internal commerce of the colonies.[4]

Nor was the regulation of trade, strange as it may seem, considered by the colonists as beyond the legitimate right of the mother-country. The American revolt was not caused by the old-established restrictive policy, nor by any particular modification of an exceptional kind, but was due to an attempt on the part of the British Parliament to collect *revenue* for imperial purposes without at the same time granting representation. No doubt, in the natural order of development, the old restrictions on colonial trade would have been modified, and with the adoption of free trade by the United Kingdom the same system would naturally have been extended to the colonies; but it is extremely improbable that but for the American separation such a complete reversal of policy could have taken place as to allow the colonies to impose protective duties on the manufactures of the mother-country. The truth appears to be that American independence completely unnerved British statesmanship in respect to colonial policy from a commercial and fiscal point of view. For half a century the remnants of the old colonies, and those subsequently acquired by conquest, were governed from, rather than by, this country through despotic governors and powerless councils; but so soon as the growing strength of the colonies and the abuses of the colonial office made them demand

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[1] *Expansion of England.*

[2] *Wealth of Nations*, bk. iv. ch. vii.

[3] *Ibid.* p. 261.

[4] The following is an example: "While Great Britain encourages in America the manufacture of pig and bar iron by exempting them from duties to which the like commodities are subject when imported from any other country, she imposes an absolute prohibition upon the erection of steel furnaces and slit-mills on any of her American plantations. She would not suffer her colonists to work in those more refined manufactures even for their own consumption. . . . She prohibits the exportation from one province to another by water, and even the carriage by land upon horseback or in a cart, of hats, and of wools and of woollen goods, the produce of America; a regulation which effectively prevents the establishment of any manufactures of such commodities for distant sale, and confines the industry of her colonies in this way to such coarse and household manufactures as a private family make for its own use, or for that of some of its neighbours in the same province."—*Wealth of Nations*, p. 261.

"responsible government," they obtained forthwith practical independence. Just at the very time when this country was abolishing the Corn Laws and preparing the way for general free trade, her own colonies were granted the opportunity of adopting protection, and whilst we have been reducing and simplifying, the colonies have been extending and complicating, the list of customs-duties. At the same time a specious justification of this timid inactivity was found in the easy popular dogmatism which passed current for an epitome of the *Wealth of Nations*. Adam Smith, who had pronounced the Navigation Laws the wisest of all the commercial regulations of England—"dictated by the most deliberate wisdom"—was supposed to have shown once for all that the only duty of the statesman, as regards things in general and colonies in particular, was to do nothing. The following passage from the *Wealth of Nations*[1] has been strangely distorted and cramped into the assertion that every colony should be allowed complete independence:—"To propose that Great Britain should voluntarily give up all authority over her colonies, and leave them to elect their own magistrates, to enact their own laws, and to make peace and war as they might think proper, would be to propose such a measure as *never was and never will be* adopted by any nation in the world. . . . The most visionary enthusiast would be scarce capable of proposing such a measure with any serious hopes at least of its being adopted. *If* it was adopted, however, Great Britain would not only be immediately freed from the whole annual expense of the peace establishment of the colonies, *but might settle with them such a treaty of commerce as would effectually secure to her a free trade* more advantageous to the great body of the people, though less so to the merchants, than the monopoly which she at present enjoys. By thus parting good friends the natural affection of the colonies to the mother-country, which perhaps our late (1776) dissensions have well-nigh extinguished, would quickly revive. It might dispose them not only to respect for whole centuries together that treaty of commerce which they had concluded with us at parting, but to favour us in war as well as in trade." Practically what we have done in the last half-century is to give up "all authority" without any attempt to secure the "treaty of commerce." And the curious thing is that the paternity of this policy should be ascribed to Adam Smith.

As a matter of fact this same Adam Smith propounded the most definite and most practicable scheme ever yet published of Imperial Federation. He was not afraid of substituting for the British Parliament the States-General of the British Empire.[2] "There is not the least probability that the British constitution would be hurt by the union of Great Britain with the colonies. That constitution, on the contrary, would be completed by it and seems to be imperfect without it. The assembly which deliberates and decides concerning the affairs of every part of the empire, in order to be properly informed ought certainly to have representatives from every part of it. That this union, however, could be easily effectuated, or that difficulties and great difficulties might

[1] *Wealth of Nations*, p. 277.

[2] *Ibid.* p. 425.

not occur in the execution, I do not pretend. I have yet heard of none, however, which appears insurmountable." [1] Not content with a statement of general principles, Adam Smith actually examined the system of taxation in force at the time in Great Britain, especially the customs, excise, the land-tax, and stamp-duties, with the view of determining how far they might be applicable to all the different provinces of the empire, and he devised a scheme according to which "the British Empire would afford within itself an immense internal market for every part of the produce of all its different provinces." [2]

It is of the utmost importance to observe that the question of tariffs embraces much more than protective duties and free trade (in the narrow sense of the terms). Trade may be cramped and petty jealousies may be created by taxes which are imposed avowedly for revenue only. A system of taxation may be thoroughly bad without a single differential duty. The great merit of Adam Smith as a financial reformer—or rather as the teacher of a succession of financial reformers—consisted not in his mere condemnation of protectionism pure and simple, but in his substitution of a few broad principles of finance in place of an unintelligible mass of historical survivals. If British statesmen had applied these principles as they were generally adopted by the United Kingdom to the rest of the Empire, Adam Smith's Utopia of an immense internal market would have been already realised.

The consequence of the want of central control has been vividly presented in the admirable synopsis of the tariffs and trade of the British Empire by Sir Rawson Rawson, which reveals "the inexplicable and purposeless differences in the articles selected for duties and in the rates charged upon them in many parts of the Empire." It is not to be wondered at that the process of compilation should have filled the mind of the compiler with dismay, and that he should write of the "few enthusiasts" who have dreamed of or longed for a common British tariff. But *testimonia non numeranda sed ponderanda sunt*, and one of the "few enthusiasts" is Adam Smith, who has foreshadowed most of the other economic reforms actually accomplished in the present century.

Encouragement may also be found in the fact that the present synopsis is to the corresponding synopsis of the United Kingdom, which confronted Adam Smith, as an unweeded garden to an untouched jungle. Every one knows Sydney Smith's description early in the century of the taxed Englishman, taxed on every article that he used from the cradle to the tomb; compared with him the most taxed of colonists bears an easy load.

The main object of the present paper is to point out the principles and the advantages of the financial reforms of the present century in the United Kingdom, with the view of showing that—at any rate to a great extent—similar reforms might be carried out for the rest of the Empire. The question will be considered *first* from the point of view of Revenue (with the indirect consequences), and *secondly* from the point of view of Protection. The first and more important question has too often been

[1] *Wealth of Nations*, p. 281. [2] *Ibid.* p. 425.

neglected in favour of the second, and an attempt may well be made to restore the due balance of emphasis.

"It has been the opinion of many people" (Adam Smith probably had in view his friends the French economists) "that by proper management the duties of customs might, without any loss to the public revenue and with great advantage to foreign trade, be confined to a few articles only."[1] This has been the guiding principle of British financial reform for a century, and has completely revolutionised our system of taxation. So early as 1787, "to obviate the trouble and inconvenience arising from the multiplicity of Acts relating to the customs, Mr. Pitt introduced a bill for their consolidation,"[2] and there is little doubt that, but for the gigantic wars in which the country was engaged, he would have gone much further in the simplification of the tariff. "No, we must stand till you are seated, for we are your scholars," is the saying attributed to Pitt when Adam Smith came in very late to a distinguished dinner party; and from Pitt to Gladstone all the great British financiers have been scholars of the Scottish Professor. As is usual with British institutions, growth took the place of revolution. The system of natural liberty was not applied like dynamite *à la Française*, but little by little like leaven was introduced until the whole lump was leavened. This style of argument may seem of the nature of ancient history, but it is not so—it is the key-stone of commercial federation. Let the people of the mother-country and the provinces only remember that the tariffs of the United Kingdom itself, even fifty years ago, were in a worse confusion than those of the Empire at present, and that a century ago the confusion was infinitely more confounded, and we should hear a good deal less of that "idea of impossibility" which, as Bacon said, is the greatest obstacle to any reform of any kind.

To return to the guiding principle. It is maintained that, so far as revenue from customs-duties is concerned, the provinces might with advantage tax few articles instead of many. It is hardly necessary to add that the smaller the number the greater scope there is for uniformity, and that every reduction brings us nearer fiscal consolidation. It is not easy to give the general reader an adequate notion of the confusion of the present system—he must refer to Sir Rawson Rawson's tables for a complete purview. Samples of chaos are rather curious than instructive, but even samples are better than purely general description. Take the case of *Live Animals*:[3] In twenty tariffs they are all free, in eleven they are partially free. They are usually charged with specific duties, but in two instances they are charged *ad valorem* as unenumerated articles; in four some kinds are charged specific rates and others *ad valorem* rates; and in only five are all kinds charged specific rates. In one of them (the Bahamas) swine are charged by weight 2s. 9½d. per cwt. It is worth remarking that during the first part of this century live animals were on the British tariff list, but in spite of the strength of the landed interest they were taken off. To proceed: "The only article under the head of *Raw Materials* which is almost universally free is manures—guano and chemicals," and the latter, we are

[1] *Wealth of Nations*, p. 339. [2] *Ibid.* p. 221, *note*. [3] *Synopsis of Tariffs*, p. 15.

reminded in a note, are not strictly raw material. Guano is an excellent beginning of freedom, but why should most tariffs include resin, tallow, tar, and timber? Timber, by the way, since a famous speech by Mr. Gladstone, is the classical example of the advantage of the reduction and final abolition of a customs-duty; as the duty (in this country) was increased the revenue fell, as the duty was lowered the revenue increased, and when at last the duty ended the indirect effects were soon proved to be productive of still greater revenue through the general increase of wealth.

Some colonies in regard to *manufactures* tax everything not specially enumerated as free, whilst others make a list of one or two hundred for taxation, and leave the rest free. A similar variety of treatment is accorded to *minerals* and *metals*. Coals are free in 23 tariffs. In 11 they are charged specific duties, and in 8 *ad valorem*. Salt is free in 13, it is charged specific duties in 21, and *ad valorem* duties in 8. Will any one seriously maintain that special circumstances, whether of climate, race, history, or prejudice, can justify such a curious diversity of principles and methods? Can any one give a rational answer to the question why *guano* and *books* should be almost universally free, but almost everything else liable somewhere or other to be hit with a tax? Guano is economically the simplest of raw materials, whilst books are the most complicated of manufactures. Any one who imagines that he has found an answer to this problem may go on to the question why prints and engravings are generally liable to the unenumerated rate.

It may be said with much appearance of justice that uniformity, in itself, has no real advantage, and that our income-tax is itself a congeries of indefensible anomalies.[1] Certainly no one acquainted with the elements of economic or constitutional history will lay any stress on uniformity as such; but the point is, that these tariffs furnish varieties not of good but of bad principles. From the nature of things a great mass of the articles taxed cannot pay the expense of collection, as was certainly the case with the 1000 articles on the tariff of the United Kingdom some fifty years ago. Government does not gain what the people lose. In this connection it must be noted that the cost of customs-duties is far greater than appears at first sight. In the United Kingdom, under the present simple system, it has been computed (by Jevons, Cliffe Leslie, and others) that the real cost, direct and indirect, of customs and excise duties is nearer thirty than the nominal three per cent. of the revenue collected.

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[1] Compare Mr. Gladstone's Financial Statement, April 18, 1853. The income-tax was first imposed as a war-tax by Pitt, and "dropped along with the purpose of the income-tax in 1816." But it was destined to be revived, and in 1842 Sir Robert Peel "called forth from repose this giant, who had once shielded us in war, to come and assist our industrial toils in peace. . . . It has been the instrument by which you have introduced and by which ere long I hope you may perfect the reform, the effective reform, of your fiscal and commercial system; and I for one am bold enough to hope and to expect that in reforming your own fiscal and commercial system you have laid the foundations of similar reforms—slow, perhaps, but certain in their progress—through every country of the civilised world." Yet Mr. Gladstone added that in his opinion the income-tax was not well adapted for a permanent portion of our ordinary financial system, and he proposed a plan for its abolition, which was to come into effect in 1860!

There are, perhaps, only two general arguments which can be advanced in favour of customs-duties of a heavy and extensive kind. In *the first place*, the convenience to the consumer may be set against the inconvenience to the trader; and *secondly*, they may be supposed to encourage native industry. As at present we are only concerned with revenue taxes, the argument of convenience must be considered first. Now it is no doubt perfectly true that when a tax is imposed upon some article of general consumption, the tax-payer does not notice the little instalments of which his contribution is made up so much as he does when subjected in some form or other to the "odious visits" of the tax-gatherer. This is especially true when the tax is an old tax, for it is then considered as part of the natural cost of production or of acquisition. "An old tax is no tax" is so far at least a true saying. Probably not one man in ten thousand, as he drinks a glass of beer, could tell how much of the cost was due to taxation; whilst the whole ten thousand regard the income-tax and various rates as mulcting them directly in so much money for which apparently there is no return. Direct taxes savour of compulsion, whilst indirect taxes are always accompanied by the pleasures of consumption.

At the same time, however, it is easy to exaggerate this element of convenience and this apathetic ignorance of the tax-payer. The consumer loves cheapness and abundance, as was well illustrated recently in the reaction against the M'Kinley Tariff. It is safe to say that no argument founded on convenience would induce the people of this country to submit again to a tax upon bread. Even the shilling registration-duty was forced to follow the rest of the Corn Laws. Colonies which desire to encourage immigration must know very well that the people whom they wish to attract always try to form some idea of the scale of living. Because colonies are young nations, it does not follow that colonists are young children, and ought to be treated as such. Colonists above all people are robust and fitted to bear present inconveniences for future advantages. Colonial statesmen who wish to spend extravagantly may find indirect taxation highly convenient; but convenience of this kind is not generally to the interest of the public.

The argument founded on convenience to the tax-payer in his contribution to the revenue obviously loses all significance, or rather may be advanced on its opposite side, when the duties are practically unremunerative; and this must generally happen when the tariff-list is very extensive. By a very natural process taxation on commodities tends to spread from one thing to another—and this for several reasons. There is an idea, which to some extent is well founded, that if taxation is spread over a large surface it will be less felt, and that the yield will also be larger and more stable. British statesmen have several times called attention, with an appearance of apprehension, to the small number of our sources of revenue. Mr. Lowe was induced thereby to invent the Match-Tax, with its elegant motto, "*Ex luce lucellum*"; and Mr. Goschen's Wheel-Tax had doubtless a similar origin, and deserves for its epitaph, "*E vectura vectigal.*"

If one article is taxed, all possible substitutes must be taxed also. If

we consider that there are many modes of supplying most wants, and that material things like natural species run into one another, the logical outcome of this principle of taxing substitutes is to tax everything. Certainly the tariff-list tends to become longer at a rapidly increasing rate. Then there is a kind of popular idea of justice which demands that if the consumption of one class is taxed other classes shall be taxed in like manner. Thus, in the end, the idea of convenience is lost sight of, and in the vast majority of cases customs-duties are levied not simply for revenue, but at the best as supports and protectives for other taxes which do yield revenue.

It must be observed, however, at this point, that probably no practical politician would seriously propose to abolish customs-duties altogether.[1] In the United Kingdom about 22 per cent. of the general revenue is due to that source; but then there are practically (making allowance for substitutes and varieties) only four or five articles on the tariff. The principal reform advocated is an approximation to this simplicity by the colonies, especially in the abolition of their general taxes on unenumerated articles, and—where enumeration means taxation—in the curtailment of the list. In Tasmania, for example, 10 per cent. is charged on 155 articles, besides other rates on 30 more articles; whilst in Newfoundland and Canada 20 per cent. is levied on unenumerated articles, and enumerated articles pay *ad valorem* rates of 5 to 50 per cent. It is plain from simple arithmetical principles that, for the purposes of revenue, such duties are too numerous and too high.

Before passing altogether from the question of the convenience of revenue-duties, some attention must be given to a specious popular argument which will also serve as a transition to the question of protection and retaliation. With many people customs-duties find favour above all other modes of taxation, because they fondly imagine that such taxes are paid by the foreign producer or trader, or in some way by the foreigner in general.

It is a curious illustration of the original sin of all taxation, that the idea of taxing the foreigner, instead of appearing contemptible, as it ought to do, and at any rate unworthy of a great nation, seems to have a peculiar attractiveness both for people and statesmen. It is apparently a survival of the time when in all languages the words for stranger and enemy were identical. It is worth recalling some instances of the manifestation of this robust barbarism in British history in former times. Probably the earliest form of taxing the foreigner was by levying tolls on passing bridges, entering markets, etc., and the first free traders were merchants who obtained from the king (for a consideration) licences of free passage through his dominions. The much-vaunted clause in Magna Charta, which apparently gave free trade to all merchants "saving the ancient customs of the realm," was really intended to secure the rights of the towns and lords of manors in the exaction of dues.

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[1] Cliffe Leslie, in an essay on Financial Reform, published by the Cobden Club, proposed the abolition of all indirect taxation, but few other reformers have gone beyond the 'free breakfast table."

Next to tolls were import-duties. These at first took the form of the exaction for the use of the king of a certain proportion of certain things, the levy being at first made in kind. Like other proportional payments, however, they gradually were converted into money, and also became fixed. Thus the origin of the "ancient and great customs" is to be found in the right of the king to tax the foreigner. The same leading idea is found in the case of export-duties. For a long period our principal exports were wool and other raw produce, and the king was entitled to a certain proportion. In process of time this proportion gave place to money payments, and to facilitate and ensure the collection of this revenue the export of these "staples" was confined to "staple" towns. These towns were in foreign countries, so that the foreigner was not only taxed but actually taxed in foreign parts. It is hardly necessary to recall the barbaric customs as regards shipwrecks, the piratical exploits in the Spanish main, the Navigation Laws, "really founded," as Adam Smith says, "on national animosity," and the long list of differential commercial treaties, to illustrate further the position that for centuries the idea of taxing the foreigner, directly or indirectly, was considered in the highest degree laudable. It is by no means easy to uproot the sentiments and prejudices that have grown up with the national life, and it is very doubtful if "good-will" to the foreigner, and "peace on earth" were more than pious war-cries in the battle of free trade. If any British statesman, even at the present time, could formulate a practicable scheme by which other nations were compelled or induced to pay the principal part of our taxes, that statesman would be the most popular man in the country.

Fortunately, however, for the interests of peace and the development of international trade, taxing the foreigner is very like "shearing the wolf." It is quite true that *theoretically* under certain conditions one nation might obtain from other nations, either by export or by import duties, a considerable part of its revenue, but it is equally true that these conditions are extremely unlikely to arise; and even if they did arise, it is still more unlikely that the wisdom of statesmen would be equal to the task of taking advantage of them. It is important to observe that theoretical exceptions may be admitted whilst the practical application is denied, for no greater harm has been done to the spread of "Free Trade principles" in the broad sense of the terms than by the attempt to reduce them to a fictitious simplicity. To assert that every import-duty must *necessarily* fall on the home consumer is as false as to assert that every export-duty must necessarily fall on the foreign consumer; it is equally untrue to say that *necessarily* the import-duties fall on the foreign producer and the export-duties on the home producer. As a matter of fact the incidence of export and import duties, especially when the indirect effects are considered, is the most complicated and difficult problem in economics. It is so difficult, indeed, that one of the strongest arguments in favour of a very simple system of customs-duties is to be found in the uncertain and indeterminate effects to which, especially indirectly, all taxes on commodities give rise.

It is impossible, in a paper of these dimensions, to discuss the theory fully, but sufficient may be said to demonstrate the position that, *primâ facie*,

the incidence of import-duties is indeterminate, and that the effects are very wide-reaching. Suppose, then, that a nation suddenly imposes an import duty upon some important article of commerce. The immediate effect is to raise the price of the article: that is to say, the importers and the foreign producers endeavour to go on with their trade without any loss of profit. But the natural effect of this initial rise in price is to check the demand. The degree of the check, however, depends on the kind of article. It is conceivable that if the demand is very "inelastic"—if the article, for example, is a necessary, the quantity of which consumed may be regarded as a first charge upon the national income—the rise in price may have very little effect upon the quantity demanded. In this case it is possible that the whole tax would be paid by the home consumer. But suppose, as is possible, that the demand falls off, the question arises: Will the competition of foreigners induce them to lower their prices in order to get the same market as before for their wares? In this case, again, it is possible that the market of the taxing country is so important relatively to other markets that the foreigners cannot better themselves elsewhere, and to find an entrance must themselves pay the tax—at any rate in the first instance. Between these two extremes any degree of division is *theoretically* possible. We have to consider the intensity of the home demand, the demand of other nations, and the possibility of the use of substitutes of various kinds. The tax may kill the trade altogether, or directly and immediately, so far as demand is concerned, it may have very little effect. For a time at any rate, in the former case, the foreign trader may sell his stock at a loss, and in the latter the consumer may disregard the rise in price.

But demand is only one side of the problem; for the complete solution we must look at the conditions of supply. If the home consumer bears the whole tax the conditions of supply will of course be unaffected; but if there is any check to demand, and some part of the tax, in the first place at least, falls on the foreigner, it is most important to consider what will be the effect upon his production. And here arises the question: Who is the foreigner who is called upon to suffer by the tax? In other words, will the tax in the first place fall upon the profits, or the wages, or the rents earned by the particular industry? Can the loss in the profit of the merchant be transferred to the manufacturer or producer? Can he in turn indemnify himself by transferring the loss to wages, or, in the case of raw produce, to rent? Finally, in any case can the particular class injured by the tax eventually transfer this loss to the foreign community in general? Now a little reflection will show that there is no general answer [1] to these questions, but that the particular answer must depend upon the particular conditions, as, for example, the mobility of labour and capital in the industry concerned, the total or partial monopoly of the product, and the scope for the expansion of industry in other directions.

So far, however, only comparatively immediate effects of the particular tax have been considered. There are also important ulterior effects resulting from the fact that all trade is reciprocal and inter-dependent. If

[1] The recent reports on the immediate effects of the M'Kinley Act upon various German exports show that whilst some have suffered severely, others have been hardly affected.

by taxation importation is crippled, in some branch or other the export trade must be similarly affected. If, to take an extreme case, the United States were to prohibit all importation of foreign wares, it is plain that exportation must also cease. No country would export without a return; in trade nothing is given for nothing. And what is true of the extreme is true in a less degree of the less extreme. If you check imports, *ipso facto* you check exports. But then as soon as exports begin to suffer, a similar series of questions arises as to the distribution of the loss. Suppose, for instance, that the general effect of the M'Kinley Act is not to prohibit absolutely but simply to check importation into the United States. The foreigner will suffer, but in what manner and in what degree? Exportation from the States must also be diminished, and American producers will suffer; but, again, in what manner and in what degree? Which will suffer most—the American or the foreigner? The number of these questions might be indefinitely extended, and the only answer is that an answer is impossible.

At the same time, however, it is possible to indicate in a general way some important practical results, which are confirmed by historical or actual conditions. The first and most obvious is that every tax upon commodities is so far a barrier to trade; it is with manufactures like an increase in the cost of production, with raw materials like an impoverishment of natural resources or deterioration of climate. In whatever way the loss is distributed trade must be injured. There can be no doubt that the heavy duties imposed upon British goods by foreign nations not only affect the foreign consumer but indirectly at least the British people. "Take care of the imports, and the exports will take care of themselves," is a proposition that may easily be turned round, and we may ask: "If the world were to refuse our exports, how should we obtain our imports?" But every foreign customs-duty is a partial refusal.

As regards the primary incidence of import-duties, although theoretically it is indeterminate, there can be little doubt that as a rule these duties raise the price of the article to the home consumer. This arises from the fact that there are very few monopolies in foreign trade, and that unless the home consumer pays the greater part of the tax importation will cease. And here it must be observed that by well-known principles the article rises in price by more than the amount of the tax. It is clear, for example, that unless the tax is collected immediately before the article goes into the hands of the consumer the burden is cumulative. Merchants must have trade profits upon advances made for taxation, and these profits must include insurance against risk. This loss may be partially mitigated, but can never be wholly neutralised, by bonded warehouses and similar devices; but the broad fact remains that practically, as a rule, indirect taxes take more from the people than they furnish to the Treasury.[1]

[1] "Therefore, for every penny of duty we ask you to surrender, we feel that we are giving nearly double that advantage to the consumer, and a great impetus to trade."—Mr. Gladstone on the *Soap Tax* in Financial Statement, 1853. He went on to show that one indirect effect would be to diminish African slavery, by encouraging the export of palm-oil, and thus the spread of legitimate commerce.

The great evil of indirect taxation is to be found in the indirect effects. It ought not to be necessary to reiterate arguments which British economists have expounded over and over again, and enlightened with a wealth of illustration.[1] Unfortunately, however, there is a tendency to believe that truths lose in force as they lose in novelty, and well-established maxims have often been driven out temporarily by re-discovered errors. The two young gentlemen who, according to Swift's diary, "discovered that there is no God," were probably wrong in their reasons; and in the affairs of the world also wisdom is slowly accumulated. Let the sceptical reader refer to Mr. Dowell's excellent volumes on the history of taxation; and if any one thinks the incidence of taxes an easy matter, let him look up his Mill (bk. v. ch. iv).

Another point of practical importance arises in connection with the fallibility of statesmanship. Industrial conditions are constantly changing, and to adjust complicated tariffs to complicated changes is well-nigh impossible.[2] It is one thing to make out a hypothetical case on paper, and quite another to put it into practice. It is a remarkable fact that the very part of the old protective system which received praise from Adam Smith—namely, the Navigation Laws—was the first part to be attacked by practical free traders. The simple reason was that other nations retaliated, and that attempts were then made to arrange reciprocity treaties until such an entanglement of interests and jealousies was created that the whole system fell to the ground. Similarly it is safe to predict that if any general system of customs-duties is to be established for the whole Empire, it must be on broad, simple principles. To suppose that a concession or restriction in one part must be met by some reciprocal operation in another, and that masses of local prejudice must be conciliated in different ways, is to confess that commercial and fiscal union is impossible. Fortunately, however, there can be little doubt that in the provinces as in the centre simplicity would be more productive of revenue than the present complexity.

Hitherto the question has been treated as far as possible simply from the point of view of revenue; but to many people the question of revenue seems of far less importance than that of free trade and protection. What they demand is not so much free trade within the Empire as restriction against the rest of the world, and they apparently assume that this would be the natural development of our present colonial system. Before, then, proceeding to examine briefly the protectionist ideal, a short passage on the present state of affairs may be quoted from Sir Rawson Rawson.[3] "With regard to the question of duties imposed for the protection of local interests, agricultural or manufacturing, it is not easy to trace them in these tariffs except in two or three prominent cases.

[1] "The statesman who should attempt to direct private people in what manner they ought to employ their capitals would not only load himself with a most unnecessary attention, but assume an authority which could safely be trusted not only to no single person, but to no council or senate whatever, and which would nowhere be so dangerous as in the hands of a man who had folly and presumption enough to fancy himself fit to exercise it."—*Wealth of Nations*, p. 200.

[2] *Synopsis of Tariffs*, p. 16.

It requires local knowledge to determine whether here and there some particular duty has been imposed or incurred for the purpose of encouraging local interests, or whether a generally high rate of duties on manufactures has been imposed for fiscal or for protective purposes. In general the method of favouring such interests has been by abolishing or remitting the duties on articles required for their use—as, for instance, the admission free of duty into several of the West Indian Islands of machinery used in the preparation of colonial products. . . . The three decided exceptions appear to be Malta, Victoria, and Canada, to which must now be added South Australia." Again, the first sentence in the summary of results runs:—"As it is clear that the duties, with few exceptions, have been imposed mainly for fiscal purposes. . . ."

Even if the present state of affairs in the Empire at large were far more protectionist than appears to be the case, it would be superfluous to enter into any general discussion of the principles of free trade. For any action must depend not only on principles, but upon facts and actual conditions. As regards principles, the advocates of free trade have unquestionably damaged their cause by dogmatism and exaggeration. By attempting to prove a universal negative—that in no circumstances whatever could a State gain by retaliation or differential duties or other devices of protectionism—they have made their opponents believe that the general case for free trade is destroyed if one particular exception can be proved. But, theoretically, as economists of the first rank, from Adam Smith[1] and Ricardo to Professors Sidgwick and Marshall, have admitted, it is easy to point out, not one, but several exceptions. For practical purposes, however, so far as the British Empire is concerned, these exceptions are simply part of the casuistry of economics; they are like the discussions by moral philosophers of the justification of occasional mendacity. Free trade, like honesty, still remains the best policy. And it remains the best policy not only because any other policy to be equally successful would require the perfectly wise despot, but largely also, no doubt, because its principles, as applied to ordinary cases, are generally sound. To couple free trade within the Empire with protection against the rest of the world is to destroy a practical proposal by the addition of a proposal utterly impracticable. This has been abundantly proved, implicitly if not explicitly, in the preceding paper of this series by Mr. Chisholm. Is the United Kingdom likely to tax raw materials such as cotton and wool, or food-products such as wheat and mutton, simply with the hope that a policy of this kind would please the rest of the Empire, or, rather, certain portions of it? Would the colonies consent to send all their produce to our markets and so deprive themselves of foreign wares? A glance at the facts showing the magnitude of the foreign trade of the Empire is enough to prove that the ideal—even if otherwise attractive—is impossible. A petty uniform duty on all foreign products would simply be a source of irritation, and is not worth considering.

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[1] Adam Smith's four exceptions are well known. *Wealth of Nations*, bk. iv. ch. ii. Compare also Sidgwick's *Principles of Political Economy*, bk. iii. ch. v.; Marshall's *Principles of Economics*, bk. x. ch. xii.

The objector may, of course, refer to the policy of the United States, and may argue that the British Empire might with advantage follow the same lines of development. But the conditions are wholly different. The foreign trade of the United States is comparatively unimportant, whilst that of the United Kingdom is, with its increasing population, essential to its existence. And even as regards the United States it is doubtful if it can long retain its commercial independence, and its present system is due much more to accident than design.[1] It furnishes also a warning, on a colossal scale, of the principal evil connected with protection—namely, the difficulty of getting rid of vested interests, and the tendency of one protective duty to beget a multitude. Even Adam Smith admitted that "when particular manufactures by means of high duties or prohibitions upon all foreign goods which can come into competition with them, have been so far extended as to employ a multitude of hands, humanity may in this case require that the freedom of trade should be restored only by slow gradations and with a good deal of reserve and circumspection."[2] But this is surely the strongest argument against the creation by new countries of barriers which, when conditions have changed, it will be so difficult to remove. *Ocurrite morbo* should be the motto for those of our colonies which have to some extent yielded to protection : the old country is far too seasoned to be inoculated.[3]

Those who advocate any reform must remember that the most fatal obstacle is the exaggerated emphasis laid upon the difficulty of making any change. Get rid of the "idea of impossibility," and the task is more than half accomplished. There are, it is true, economic laws which cannot be sent to Saturn, as every nation has found to its cost by numberless experiments, but no system of taxation is by nature eternal and immutable. If little by little colonial statesmen would follow the example set by the great British financiers of this century, and reduce and abolish their duties, it would be easy to establish a fiscal union. Such a union would bind far more closely than a nominal association for defence. It would naturally lead to the creation of other commercial ties, and silently and insensibly would weld together the fragments of our so-called Empire. For it is as true now as it was when Adam Smith wrote that "this empire has hitherto existed in

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[1] See an admirable paper by Professor Taussig in the *Economic Journal* for June 1891, on "The M'Kinley Tariff Act."

[2] Book iv. c. ii.

[3] A striking instance is given by M'Culloch (Edit. of *Wealth of Nations*, note xxv.), of the evil effects of forcing a colonial trade :—"The trade with Canada may be referred to in proof of what has now been stated. It employed a large number of ships and seamen, and seemed to a superficial observer to be highly valuable. In truth and reality, however, it was very much the reverse. A half of this trade was forced and fictitious, having originated in the excess duty which was formerly charged on the Baltic and other foreign timber. The high duty on foreign timber tempted the merchants to resort to Canada, New Brunswick, etc., whence they imported an inferior article at a higher price. . . . By refusing to import the timber of the North of Europe, we proportionally limited the power of the Russians, Prussians, Swedes, and Norwegians to buy our manufactured goods ; while by forcing the importation of timber from Canada, we withdrew the attention of the inhabitants from the most profitable employment they could carry on."

imagination only. It has hitherto been not an empire but the project of an empire, not a gold mine but the project of a gold mine. . . . It is surely now time that our rulers should either realise this golden dream in which they have been indulging themselves, perhaps, as well as other people, or that they should awaken from it themselves. If the project cannot be completed it ought to be given up. If any of the provinces of the British Empire cannot be made to contribute towards the support of the whole Empire, it is surely time that Great Britain should free herself from the expense of defending those provinces in time of war, and of supporting any part of their civil or military establishments in time of peace, and endeavour to accommodate her future views and designs to the real mediocrity of her circumstances." Such is the concluding passage and, for Britons, the culmination of the whole argument of the *Wealth of Nations*, a work which, alike in speculative genius, breadth of view, and practical wisdom, stands alone in political literature. We must choose between federation and disintegration, and, if we wait for the pressure of a great calamity, the warning of history is that the alternative will no longer be offered.

THE GEOGRAPHY OF SOUTH-WEST AFRICA.

(*Read at Meeting of British Association*, 1891.)

By Dr. Henry Schlichter.

Many parts of South-West Africa—by which in this paper we mean the the countries between Cape Colony and the Cunene and Okavango rivers —are still very imperfectly known or even entirely unexplored on account of their sterile and inhospitable character. The land along the entire coast is of the most barren and desert nature; north-west of the Herero country extends the so-called "Kaoko-field," which implies "field without water;" whilst the barren plateaus of the vast Kalahari hem in the mountainous districts of the Herero- and Nama-country east and north. Thus we see that the more fertile parts of South-West Africa are entirely encircled by regions which are difficult of access, and therefore offer great obstacles to exploration; and the result has been that the routes of many travellers who have visited these countries are confined to limited areas, and avoid the unknown parts of the above-mentioned territories.

In studying the history of South-West Africa we see that at three distinct epochs great, but more or less spontaneous, efforts have been made to open up the interior, and hence three periods of exploration are easily discernible. The first of them, which refers to the time before the discovery of Lake Ngami in 1849, has hitherto generally been believed to have been very short, for before Captain James Alexander's explorations in 1836 and 1837 hardly anything was known of the interior of South-West Africa. Quite recently, however, Mr. Theal has proved, from the archives of Cape Colony, the extraordinary fact that not only the Orange River had been discovered as early as the middle of last century (1760), several years before Gordon reached it, but also that almost

at the same time (1761-1762) a well-equipped exploring expedition penetrated into the interior of the Nama-country north of the Orange River; whilst thirty years later (1791-1792) another expedition reached a point still further north and brought the first authentic information respecting the Damara-country. I find that the British Museum contains the diary of the first of these expeditions; and as Mr. Theal, in his *History of South Africa*, has given only short accounts of these journeys without going into geographical details, I have examined the information contained in the diary, and I find that it is of geographical value, especially if we compare it with the reports of Gordon, Paterson, Le Vaillant, Thunberg, and the other travellers of last century. I have to add that, of the second of these expeditions I have hitherto been unable to obtain any other notice than the short account which Mr. Theal has given us in his book. These explorations soon afterwards seem to have been almost entirely forgotten, in part probably because of the political changes which took place in 1795 in Cape Colony.

The discovery of Lake Ngami by Livingstone in 1849, with which the second period of exploration began, induced a number of travellers to penetrate into the interior of South-West Africa, most of whom took Walvish Bay as their starting-point. Galton, as is well known, was the first who selected this route, exploring Damara- and Ambo-land. His companion, Andersson, a short time afterwards crossed the Kalahari, and reached Lake Ngami from the west. He was soon followed by Chapman, Green, Wahlberg, Baines, and others, who visited Lake Ngami and its neighbourhood. Meanwhile the course of the great Okavango River had been explored by Andersson and Green; and both these travellers, as well as Hahn and Rath, made unsuccessful attempts to penetrate north of the Ambo-country and reach the river Cunene, which up to that time was almost entirely unexplored. At last the Cunene was reached by Smuts in 1864, then by Green (1865), and Hahn (1866), at different points, and finally also by Andersson shortly before his death in 1867. But from that time the explorations of this period became fewer, and no information was forthcoming except that obtained from missionaries who laboured among the various Nama, Damara, and Ovambo tribes. Several important journeys undertaken by some of them must be mentioned, of which Krönlein's journey in South Nama-land (1867), and Böhm and Bernsmann's explorations (1877) of the Kaoko were among the most important.

A fresh and vigorous revival of the exploration of South-West Africa occurred simultaneously with the commencement of German colonial enterprise in those countries in 1884; and it was then that the third period of exploration began. A large number of scientific and other travellers like Belck, Schinz, Schenck, Pohle, Büttner, Pechuel-Lösche, von Steinäcker, Conradt, Hermann, etc., etc., traversed the German sphere of influence in many directions, contributing largely to our knowledge of the country. But geographical science has hitherto gained but little by these recent German explorations, for, with the exception of the recently published book of Dr. Schinz, and several articles in *Petermanns Mitteilungen* and other scientific journals, most of the information we are

possessed of on this subject is scattered among various German papers and periodicals, and mixed with many more or less unimportant colonial matters.

Summarising, therefore, we see on the one hand that South-West Africa is only imperfectly explored, and on the other that a considerable part of the information which we actually possess has until now been more or less inaccessible to geographers. This being the case, I have collected and compared the unknown reports of recent as well as of past times; and it is the object of this paper to lay before you a correct account of our present geographical knowledge of South-West Africa.

I. The inhospitable waterless shore of Angra Pequeña was the place at which the enterprising German merchant Lüderitz commenced his schemes of colonisation. Even the immediate neighbourhood of Angra Pequeña was unexplored territory, and since Krönlein's journey (1867) from Elizabeth Bay into the interior of Great Nama-land, nothing had been added to our knowledge of the country. Lüderitz's enterprise was commercially a total failure; but, thanks to his efforts, we possess to-day a complete and detailed knowledge of what is called Lüderitzland, viz., the territory between the Orange River and the 26th degree of latitude. Amongst the members of the first colonial and exploring expeditions sent out from Germany were several well-known explorers and scientists, *e.g.*, the late Dr. Nachtigal, Dr. Höpfner, Pechuel-Lösche, and others. W. Belck, who belonged to one of these expeditions, and who has proved himself to be a keen observer in scientific as well as colonial matters, was the first to produce a good and detailed map of the country between Angra Pequeña, Bethany and Khuias (in 1884). Leaving Angra Pequeña we come at once upon a region entirely destitute of water and vegetation, partly rocky and partly covered with downs and shifting sand, which, under the influence of the frequent south and south-west winds, are continually varying the physical appearance of the country and often rendering the roads impassable. Beyond this region the country somewhat improves, and three separate roads lead to a place called Tsirub, where the first grass, bushes, and trees (*Acacia crioloba*) are to be met with. Water is on this route at Ugama and Gao Khaosib near Guos, which is a two days' journey from the coast, and, according to Belck, about 1750 feet above sea-level, the country being a continuously rising plain. A few hours east of Tsirub the coast region terminates in a striking manner: beyond a hilly range commences a large plain covered with luxuriant grass and pastures, and, with few interruptions, extending eastward to Ar (between Aus and Bethany). A few miles from the beginning of this grassy plain Aus is reached, the most important place between Angra Pequeña and Bethany, and one of the highest points in this part of the South-West African plateau, viz., about 4700 ft. above sea-level. Eastward from Aus a region of table-mountains begins, giving to the country that peculiar appearance so characteristic of this southern portion of the continent. Here the grass-plain terminates. The next station on the route is Guibes, with a well of good drinkable water. The place is pleasantly situated in a valley with vegetation, large acacia

trees being especially conspicuous. The ebony tree is found here for the first time in travelling from the west. East of Guibes towards the end of the journey the road is very bad. It first leads over hills and mountains, and then descends to Bethany, the capital of Great Namaland. It consists of about twenty kraals, with 150 or 200 native inhabitants, and is well known to be one of the oldest mission-stations in the country; the church and mission-buildings are the only attractive objects of the place. No pastures or grass-lands are to be found near Bethany, whose importance is due to the existence of a good well of an unlimited supply of fresh water. It is a strange coincidence that wherever, between Angra Pequeña and Bethany, water is found on the surface of the ground, grass and pastures are wanting, and *vice versâ*. Lüderitz has, however, practically proved that wherever grass is to be met with, the underground water-supply is not far below the surface, and can easily be obtained by digging wells. Belck then further explored the districts to the north and south of this route: Khuias and Tiras, Kleenfontein and Kuck Aus. Khuias has a good well, and the other places grass and pastures in abundance. At all these places the physical features of the country are the same, viz., an elevated plateau upon which here and there rise isolated hills and mountains, consisting mostly of gneiss and granite rocks. In the eastern parts, as we have seen, a series of table-mountains commences. Minerals, especially copper ores, are frequently to be found, and form at present the only source of wealth of the country, which is quite unfit for agriculture, and to a very limited extent only suitable for cattle-rearing. The population is very sparse and consists of Hottentots, Bastards, and Bushmen, concerning whom some ethnographical particulars and statistics will be given further on in this paper.

Soon after Belck, Dr. Nachtigal journeyed from Angra Pequeña to Bethany; but, as he died a short time afterwards, none of the new geographical facts which he had probably collected became known, and all we have learnt from the great traveller in this respect is a remark which he made to Mr. Pohle, the leader of the subsequent exploring expedition, and which is hardly in favour of the country, viz., that instead of travelling in this country he would prefer to again cross the Sahara, where at least oases were to be found.

II. The next expedition (1884-1885) was under the command of the above-mentioned Pohle, Dr. Schenck (geologist) and Dr. Schinz (botanist) being attached to it. Its special purpose was to ascertain the prospects of mining and other commercial undertakings in the *Hinterland* of Angra Pequeña. All results in this respect were completely negative, but geographically the expedition was of considerable importance, as the country was geologically examined, numerous altitudes and trigonometric measurements were taken, and the unknown territory between Aus, Cubub, Obib and the Orange River was explored, the course of this river near the coast being found to differ from that indicated on the maps. As an account of this expedition may be found in *Petermanns Mitteilungen*, there is no necessity to enter here into geographical details.

About the same time Dr. Schinz, who, as we have just seen, was originally a member of the Pohle expedition, turned north from Angra Pequeña, and traversed the whole country between that place and the Cunene and Ngami. His book, which has recently been published, is a very important work upon South-West Africa, but, as a short account of his travels has already been given by me (*Proceedings, R. G. S.*, August 1891), I shall refer to his work only by way of comparing it with the reports of other travellers.

III. A very interesting journey from Walvish Bay to unknown parts of the Kaoko district was in 1885 made by H. Spengler, one of the officials of the German South-West Africa Company. He first went up the Kuisip to Ururas, and then across the Namieb to a place called Heimansip, and from thence *viâ* Nadap and Omip to Hopemine, north of the Kuisip. Proceeding north over large grassy plains, the party came to Kaunap and Niemasip, and passed the Tsoachaub near Nabas (somewhat below Reed). They proceeded north over flat hills of gneiss to Modderfontein and the next day reached the Khan River, up which they passed as far as Tsavisis, and from thence turned west to Ebonimine and to the sharp-peaked mountains in its neighbourhood. Scattered over the whole of this territory are numerous flat hills consisting of gneiss or granite. From thence they proceeded north to the Omaruru River, which they crossed, and after two days' journey further north came to a river called Soris-Soris. Both these rivers are periodically dry, their beds at such times being very suitable for corn-fields, gardens, and plantations. Journeying on for two days more in this unknown part of the Kaoko territory, they came to a place called Korikas, on a river of the same name, and, pushing on for another day, they reached their furthest point north, called by the Hottentots Franzfontein, not far from Otjitambi. Franzfontein is situated near a mountain, and has a very good perennial spring, which might easily be directed to the neighbouring plain, where plantations, gardens, and cornfields might be established. The pastures in this district are described as excellent, and along the before-mentioned mountain six more springs, and still further north-west four others, were reported to exist. From Franzfontein the party returned to Walvish Bay.

IV. Meanwhile another expedition had been sent by Lüderitz to his possessions in South-West Africa, to study the most important question in a dry country like this, viz., the hydrographic conditions of Great Nama-land, and especially the existence of underground water near the surface, obtainable by artificial means. Mr. L. Conradt, who undertook this task, explored (1885) with special care the country between Angra Pequeña, Bethany, Groot-Fontein, Aub, Rehoboth, and Walvish Bay, contributing in this and in other respects to the geographical knowledge of Great Nama-land. A day's journey to the west of Khuias, he came to mountains at a place called "Swartmodder," situated near a perennial spring. Khuias he describes as one of the best places in Nama-land, with large and good pastures and plenty of water from wells dug in the dry river-bed of one of the small tributaries of the Gamoxab.

From thence he went north to Ob and Ubup, both places having plenty of water on or near the surface of the ground, and being especially suitable for stations on the route between the northern and southern parts of Nama-land. Then he travelled by way of Kamxamale, Oris and Amhub to Kleen- and Groot-Fontein, two once-flourishing, but now deserted, settlements of the Bastards, who had left this district on account of the wars between the different Nama tribes. It was an unpleasant and fatiguing journey of about two days, as no water was found between Ubup and Kleen-Fontein. The soil of the plain in which Kleen-Fontein lies is fertile clay, and the Bastards had formerly dug several wells of large diameter in the clay, the water being eight or ten feet below the surface. Groot-Fontein, not long ago one of the most important places of Great Nama-land and a mission station, is now entirely desolate and in ruins. Soil and water are similar to Kleen-Fontein. Houses and gardens, which are still visible, show that the people who lived here must have been industrious and comparatively wealthy. With little effort this place could be provided with any amount of water. Nundum, which lies some distance north between Groot-Fontein and Nomtras, is situated in a large and fertile plain, but the water-supply is only periodical, consisting of a so-called "water-colk," *i.e.* a hollow in the impermeable clay. As the expedition now came near the Fish River, Mr. Conradt decided not to pass Nomtras, and, taking a more westerly direction, he came to a place called Garip at the Bloomfish River, where plenty of water and many high acacia trees were found. Then he came to Kurush and Pavianskranz, two places where he found plenty of water. The country seems to be almost without inhabitants, on account of the war which has been raging since 1880 between Ovaherero and Hottentots. At the next Hottentot settlement, Gamis, the expedition met a few families, but the men were all absent, and had joined the Hottentot chief Hendrik Witbooi. Conradt next crossed the Axob, a periodic river flowing into the Fish River. Now, being not very far from Rehoboth, he turned north to Aub. The country here is mountainous and rocky, and the roads are stony and very difficult to pass on account of many steep, dry river-beds which have to be crossed. The next stations were Omeib and Gaungam, both in broad and sandy, dry river-beds, where no water appears on the surface, but might probably be easily obtained by digging. The valley of Gaungam is a large grassy plain several square miles in area, with fertile soil consisting of sand and clay. Plenty of water might be obtained if wells were dug like those at Groot- and Kleen-Fontein. The surrounding mountains are covered with vegetation, and the soil of the plains is good and free from stones. Conradt regards Gaungam as one of the best places in the whole territory. Then the expedition came *viâ* Neureis to Rehoboth, which, as is well known, has several hot springs. Conradt found the temperature of these to be 129, 126, 122 and 108 degrees Fahr.; but he is of opinion that they have all the same origin, as the difference of temperature seems to be owing to the different quantities of water given forth. The largest spring is the hottest, and yields about eight gallons of water per minute. The water contains sulphur, and the natives use it medicinally. In the mountains not far from

Rehoboth water rises to the surface, but in the valley near that place it sinks into the soil and flows underground at a considerable depth, as the clay and sandy strata of this valley are deep. Rehoboth itself is built on limestone, a little above the bottom of the valley. The inhabitants use the water of the hot springs for irrigating their gardens and fields, in which they grow a variety of useful vegetables. The Bastards living here are very industrious, and thus prove an agreeable contrast to the other natives of Great Nama-land. The expedition then proceeded from Rehoboth to Nauas, over a stony and difficult road. This place lies in a broad river-bed, and has numerous corn-fields and much cattle, which belong to the Bastards of Rehoboth. In the middle of this river-bed flows a small brook. Then they passed Arichaus and Ob, higher up in the same river-bed, where the Bastards are as industrious as are those of Rehoboth in corn-growing and cattle-rearing. After journeying for another two hours they came to Kranznaes or Gaguis, where the last settlements of the Bastards were found. There are large and good artificial wells at this place, the water being found at about six feet below the surface. Hill-Damaras are living here in small numbers; but, owing to the war between the Namas and the Ovaherero, the whole route from Gaguis to Otjizeva was quite deserted, not a single native being seen. Still passing up the river-bed, which here runs northward, they came to Aris, which is described as a large valley well suited for cattle-rearing; the soil and pastures are good, and water is to be found a little below the surface. Trees of considerable height growing in the river-bed and on the plain give to this valley a pleasant and picturesque appearance. The expedition now passed the lofty Awas mountains south of Windhoek, the watershed between the Fish River and the Tsoachaub, and came to Windhoek, which is well known to have plenty of water issuing from several hot springs similar to those at Rehoboth. From Windhoek they took the usual road to Otjizeva and Okahandja, and everywhere found good water and splendid vegetation. The same was the case on the road to Otjimbingue and Tsaobis, where the water-supply is plentiful, and might be largely increased by simple artificial means. The last part of the journey from here to Walvish Bay yielded nothing fresh to geographical science.

V. A German, whose name does not transpire, but whose information is reliable, travelled in 1885 from Vinburg through Stellaland and Goshen, along the Crocodile River, to Bamangwato, and from thence *viâ* Botletle to Lake Ngami. He measured the length of the lake, and found it to be only 31 miles, and the banks were so thickly overgrown with reeds that the water was hardly visible. Vegetation was plentiful. The chief of the town, which was known as Letshulatebe's town at the time of Livingstone, Chapman, and Baines, was then Moremi; but on account of the attacks of the Matebele he left his settlement on the Botletle River a few years ago, and took refuge in the inaccessible swamps and islands which the Tonka forms north-west of Lake Ngami. The dominant Bechuana tribe at the lake, the Batauana, are described as

people physically and morally degenerate. They number only about 400 or 500. Macobas and Bushmen are their serfs. From thence he went to the Kopjies, which, as we know from previous travellers, are a series of high granite mountains about 20 miles south-west of the lake. They now form the boundary between Moremi's territory and the Hottentots. From this place to Elephantskloof the country is flat, but gradually rises towards the west. From Elephantskloof the route of our traveller was to Sandfontein, and from thence southwards through the western Kalahari, similar to that indicated on Farini's map. Of this interesting part of the journey the following distances and altitudes are given :—

	Miles.	Altitudes in feet.
From Sandfontein to Zwartmodder I.,	37	4300
,, Zwartmodder I. to Aanis,	17	
,, Aanis to Springbok,	28½	
,, Springbok to Zwartmodder II.,	16	4100
,, Zwartmodder II. to Lidfontein (*viâ* Bruelling),	43½	
,, Lidfontein to Zwartfontein,	58	
,, Zwartfontein to Horagas (*viâ* Schurpan),	25¾	3500
,, Horagas to Amordap,	18	3550
,, Amordap to Persop.	9	
,, Persop to Kuis (without finding water),	52⅓	3200
,, Kuis to Hansoley,	22⅔	
,, Hansoley to Grossoup,	21	3350
,, Grossoup to Learley,	34	
,, Learley to Fonteintje, *viâ* Witboy pits (without finding water),	54	
.. Fonteintje to Klipdam (*viâ* Cucugokap and Springbok),	15	2850
,, Klipdam to Abiam (*viâ* Ariam, without finding water),	56	
,, Abiam to Bloomfontein,	18⅔	
,, Bloomfontein to Cucugub,	17	
,, Cucugub to Grootnuis,	8	
,, Grootnuis to Blauwbosh,	4	
,, Blauwbosh to Uppington,	39	2400

VI. In 1888 F. Hermann journeyed through Nama-land in different directions. In the first place, he carefully mapped out the routes between Angra Pequeña and Bethany, and made numerous observations of altitudes between these two places. The position of Bethany had remained doubtful since Belck's journey. He gave its longitude as 17° 25′ E., whilst before it was given as 16° 50′. It appears from Hermann's map that Belck was wrong, but a correction is nevertheless necessary, and, considering all things, I calculate the exact position of Bethany, so far as our present knowledge of the country will enable us to ascertain it, to be in 26° 25′ S. lat. and 16° 55′ E. long. The highest elevation of this part of the South-West African plateau is at Cubub, about 5300 feet, whilst the table-mountains east of Aus and Cubub rise to about 5500 feet above sea-level.

Hermann then travelled south-east of Bethany to the Fish River. The table-mountains here have an altitude of about 5000 feet. They

terminate east of the Fish River, and other geological formations take their place. The soil of the broad valleys consists of clay and sand, and is generally fertile, as water is found not far below the surface. Acacia trees pleasantly border the banks of the river-beds. At some distance to the east rise the picturesque and high mountains of Karas. From Keetmanshop, which at that time was well inhabited, he travelled to Bersaba, to which place much cattle had been brought from the north on account of the war, and then he reached Gibeon, which he describes as the centre of all the feuds and troubles between the different Nama tribes. The country round Gibeon is the most fertile part of the whole of Nama-land, having numerous large springs besides the Fish River, in the bed of which water may always be found. This whole territory seems to belong to the table-mountain formation. From Gibeon he went north-east to Girichas, a place which has been converted into a sort of fortress, and forms a good stronghold for the inhabitants. All the country north of Girichas, almost as far as Hoachanas and Rehoboth, is entirely deserted by the natives. Low table-mountains, grassy plains, much water, and pleasant vegetation are the chief features of this region. From Hoachanas and Rehoboth the expedition went by well-known routes to Windhoek, Okahandja, and Walvish Bay.

Hermann's return journey from Walvish Bay to Angra Pequeña also furnished some more new facts. He passed the watershed between the Tsoachaub and Fish River at a height of 10,000 feet, south of Windhoek, an elevation which, if correctly measured, is the highest altitude observed in South-West Africa. From Rehoboth he travelled to Groot-Fontein, nearly 200 miles, through an entirely deserted country. The country was either rocky or plain, and covered with beautiful grass. A little north of the Fish River the table-mountains commence, at first forming only low hills. Groot-Fontein lies in a long and broad valley, 4600 feet above the sea, and surrounded by table-mountains, which rise 1000 feet higher. The game has derived advantage from the desertion of the country; and Hermann found many thousands of antelopes near Groot-Fontein. The clay soil there is very fertile. A day's journey on horseback south of Groot-Fontein he reached the watershed of the Lever River and the Chamcharib, which flows past Bethany (that is to say, only when rain has fallen). Here the ground slopes very suddenly towards the south; at about 20 miles distant the road was 1000 feet lower. Khuias is the next station, about another day's journey to the south. The mountains near Khuias form a striking contrast to the table-mountains, being high and picturesque isolated granite mountains, visible even from Bethany, which is 50 miles distant.

VII. I add some notes about a journey which is in part beyond the limits of this paper, but in other respects of great importance as regards the geography of the interior of South-West Africa. It was undertaken by Schulz and Hammar in 1884. Starting from Port Natal to Pretoria and Bamangwato, they travelled through the Kalahari to the Makarikari Lake, and from thence north to Pandamatenka and the Victoria Falls. They then went to the Chobe, and up this river for about 410 miles, in

spite of numerous and extensive swamps, till they came to the mouth of the Liana River, which flows westerly into the Chobe. Somewhat above that point they came to a chief called Matabandja, and from thence turned west to explore the Cubango River, which is identical with the Okavango. They reached the Cubango, near Libebe, after a difficult march of seventeen days over sandy deserts, but were treated so badly by the chief Ndale (Ndala, Andara) that they were obliged to turn south-east to Lake Ngami. The Cubango, near Libebe, is described as a beautiful river of deep and clear water, studded here and there with islands; but further down the river becomes broad and swampy, abounding in hippopotami, crocodiles, and fish.[1] After a journey of twenty-three days, the travellers came to Moremi's town at the Ngami. From thence they returned through the Kalahari to Bamangwato, the Transvaal, and Natal.

Besides these journeys a great many reports and notes have appeared during the last six years upon the physical and ethnographical conditions of South-West Africa, and the following description of the country is taken chiefly from these. Four regions, totally distinct in their physical and geological character, are to be found in South-West Africa. From whatever part of the Atlantic coast we start, we have to cross a desert region of the worst kind, with no water and hardly any trace of vegetation. This desert extends uninterruptedly from the Portuguese possessions to Cape Colony, and completely separates the interior of South-West Africa from the Atlantic seaboard. In its southern half (from the Orange River to the Kuisip) it is covered with large downs and shifting sands, the latter being carried inland by the prevailing south or south-west winds; but near the Kuisip the downs become smaller, and disappear entirely before Walvish Bay is reached. The desert is partly mountainous, as *e.g.* near Angra Pequeña, where numerous hills and mountains are found, and partly level, the plains rising gradually towards the Interior, and the soil consisting of conglomerates. An instance of this is the dreaded Namib or Nariep, which extends east of Walvish Bay, and which all travellers have to pass on their way to Damara-land. The formations are throughout Palæozoic rocks, chiefly gneiss, which at many places crumble very quickly, the result being the sand which, by the action of the regular winds from the sea, forms the downs. This is the general belief; but it must be noted that Barrow and lately Dr. Stapff (who explored the valley of the Kuisip geologically), have given another explanation, viz., that the whole of the West Coast of Africa is slowly rising (for which indications have been found by Dr. Stapff in the various shell-layers on the sea-shore), and that hereby sandy rocks are gradually appearing above the sea-level, and when these are exposed to atmospheric influences they form the downs and sand. Although this is not conclusively proved, it cannot be denied that several other observations also point to the fact that the whole of South-West Africa is slowly rising; and I

[1] Schulz is of opinion that a bifurcation exists between the Okavango near Libebe and the Chobe.

consider it probable that the remarkable decrease of water in South Africa which has occurred during the present century is connected with this fact. But whatever the origin of the sand and downs, they must be regarded as a distinct geological formation of very recent date, the present appearance of which is due chiefly to the action of sun, moisture, and wind. East of this desert the country rises more or less suddenly to the highlands of Nama- and Herero-lands, with their lofty peaks, broad table-mountains, and deeply cut river-beds. Geologically, many of the mountains of the Herero country belong to the same period as those which we meet with on the shore of Angra Pequeña, viz., Palæozoic rocks, especially gneiss and crystalline schists, which in South Nama-land are confined to a small belt near the shore, and often interrupted by the sand and downs region. Their general direction is north and south, but east of Walvish Bay they extend fan-like over a great part of the Herero country, and form the picturesque mountains of Omatako, Otjihivero, Awas, and many others. Further north, in the Kaoko territory the Palæozoic formation is again limited to the districts near the Atlantic, the eastern parts of Ambo-land showing a more recent character, similar to the Omaheke and Kalahari. The scenery of many of the mountains of Herero-land is beautiful: irregular and gigantic masses of gneiss and granite of fantastic forms, long and deep valleys stretching in various directions, and high plateaus partly covered with vegetation, characterise the mountain regions. To the east this formation is overlaid by another, viz., sandstones, forming the so-called table-mountain formation. They usually appear in the form of broad prisms or truncated cones, and are of sedimentary origin, and probably the remnants of former uninterrupted plateaus, which have gradually disappeared through erosion. Whilst the gneiss is limited to the coast, and narrow in Great Nama-land, the table-mountains there occupy the greater part of the whole territory. Near Angra Pequeña they commence not far from the coast—a little east of Aus—and extend to the Fish River and its tributaries, where they form the Huib and Han-ami mountains and other plateaus, of which the picturesque Karas mountains probably form the most easterly termination adjoining the Kalahari. These mountains consist not only of sandstone, but also of clay-slates, quartzites, etc., a blue dolomitic limestone being especially prominent. Schenck regards the sandstone of the Huib plateau (west and south-west of Bethany) as identical with that of Table Mountain at Capetown, and the rocks of the Han-ami highlands as corresponding to the Bokkeveld group of Cape Colony, and considers the former as littoral, the latter as maritime sediments. But Gürich is of a different opinion, and regards this so-called Namaqua sandstone as part of the Karoo formation, which he identifies with the Indian Gondwana rocks. But as long as these more detailed questions remain undecided, we can, with certainty, only say that these sandstones date from the time between the Carboniferous and Jurassic periods. To the north of Great Nama-land, where the gneiss formation prevails, as we have seen, the table-mountains gradually narrow, until at last but a few isolated table-mountains appear, like islands amongst the surrounding formations. The quartzitic sandstone of these northern

mountains seems to be devoid of the dolomitic limestone which, as we have seen, forms an essential part of the Nama mountains. The rocks are of a reddish colour, produced by ferric oxide; and whilst their sides southwards are very steep, this is not the case on the north, where they slope more gradually to the plains of the Ambo country. The mountains of Omuveroume and Etjo are characteristic representatives of the table-mountains in Herero-land. East and north of Nama- and Herero-lands gneiss and table-mountains gradually change into high plateaus, which are prominent features of the countries between Herero-land and the Cunene, as well as of the Kalahari Desert. Boundless plains, slowly declining towards the east, extend to the lowest part of these territories, the Ngami Lake, and the surface of the plains is covered either with sand or with humus, or with a recent dolomitic limestone of white, yellow, or reddish colouration, in which sometimes fragments of all kinds of stones are found. This limestone covers the greater part of the Kalahari, as well as the eastern parts of Ambo-, Damara-, and Nama-lands, and it is also found at various places in the middle of Damara- and Nama-lands. The most probable explanation of the origin of this limestone is that it is the deposit of a series of former inland lakes, once covering many parts of the interior of South Africa, and of which Lake Ngami is the only remaining one. But the basis of the country below these recent deposits is everywhere formed of Palæozoic rocks, which seldom, but nevertheless here and there, rise to the surface, *e.g.* south-west of Lake Ngami, at the so-called Kopjies, a number of hills consisting of gneiss or granite. To the south the plains of the Kalahari gradually slope to the Orange River; but it must be remarked that, throughout the Kalahari the difference of altitude is so trifling that we have not yet succeeded in obtaining full and accurate knowledge of the hydrographic system of this territory. Whilst the Ngami has been calculated to be 3100 feet above sea-level, the average altitude of the whole surrounding territory is barely 20 feet higher. That these vast plains have not the character of an actual desert is well known, and water is found at many places, particularly after rain has fallen, but it is very questionable whether the Kalahari will prove well adapted for cattle-rearing, as Farini pretended to think. It must not be forgotten that frequently the Kalahari for the greater part of the year is almost impassable, except by a few routes, where sufficient water is to be found, and although not so barren and desolate as the Coast region, it will always be a formidable obstacle to the exploration and civilisation of South-West Africa. Where the fertile plains of the country of the Ovambo and the various other tribes living between Ondonga and the Cunene begin, the character of the plateau differs from the Kalahari; but it appears that more to the east, between the Chobe and Okavango, the desert and sandy regions extend considerably further north.

South-West Africa is a country with few rivers, and with the exception of the Cunene, the Okavango, and Orange, all the rivers are periodic—most of them being perfectly dry during the greater part of the year. Some, especially the Fish River, have a little water during the dry season, which, however, does not flow, but forms small lakes or pools. But this absence of permanently flowing rivers must not be regarded as

a proof that the country is almost without water; on the contrary, as the heat of the ground, and the evaporation especially in the sandy parts of Great Nama-land and near the Atlantic, is very great, all the water on the surface of the land would soon be dried up, whilst an underground water-supply evaporates much less rapidly. But we have several proofs that in former times water was much more plentiful in South-West Africa than it is now. Numerous perfectly dry river-beds might be cited in the first place; and Unio shells have been found in the ground of the Hygap river-bed, which proves that this must have been a perennial river at one time. Traces of animals and plants show that many places had in not very remote times much more water than now; and all travellers who have visited Lake Ngami agree that it is diminishing in size year by year, and it would probably have been dry long ago had it not regularly received large quantities of water from the northern countries from which the Okavango comes, and where rain is plentiful. Whether the destruction of the vegetation by the inhabitants, or a general decrease in the rainfall in South Africa is the chief reason for this diminution of water it is at present impossible to say, as we have only recently obtained systematic meteorological observations. I have, however, pointed out before that the upheaval of the country may have some influence in this respect.

If rain falls, the water trickles at once into the sandy soil, and in many cases reaches the underlying gneiss, where it forms a regular underground river-system, and in regions like the Herero country, where the rivers flow in deeply-cut beds, and descend quickly to the sea, the pressure from above is always such that even in the lower part of the river-bed water may be obtained almost immediately below the surface all the year round, as has frequently been proved in the Omaruru, Tsoachaub, Kuisip and others. But where natural barriers occur in the river-beds, or where impermeable strata of clay or limestone prevent the sinking of the water, there it comes to the surface, as is the case in many parts of Herero-land, *e.g.*, Otjimbingue, Tsaobis, Okahandja, Omaruru, etc. In places where such limestones, clays, etc., form larger or smaller cavities on the surface of the ground, the so-called water-chambers, pans, vleys are found, which, if conveniently situated, retain the water for a considerable time. Some of these vleys seem almost inexhaustible, and even in dry years are very reliable watering-places. The largest of these reservoirs is the well-known Otjikoto fountain (south-east of the Etosha pan), a perfect lake in the solid limestone with a diameter of 400 feet and a depth of more than 200 feet; and south-east of this some similar water-chambers, but of smaller size, are found. Such copious water-supply cannot be expected in Great Nama-land or in the Kalahari; not in the former, because the sandy table-mountains prevail, and not in the latter because it is, with a very few exceptions, too smooth and level to allow the water to collect largely either on the surface or underground. But at many places, even in the Kalahari, water may be found, if one takes the trouble to dig deep enough. All underground water to the west of the watershed of the Tsoachaub, Kuisip, etc., is brackish, particularly so near the sea.

Several of the table-mountains have copious springs at considerable heights, those of the Omuveroume Mountain being well known.

Rain falls only during thunderstorms and is always heavy and sudden, so that the steep river-beds are quickly filled, and a torrent of muddy water sometimes rushes down those river-beds which have been dry for months, or even years, and will again become so after the lapse of a few hours or days. In some cases these torrents reach the sea, *e.g.*, the Tsoachaub and Omaruru, at least once in a year, whilst in others the water has sunk into the soil and disappeared long before the ocean is reached.

The meteorology of South-West Africa is only imperfectly known, as only quite recently meteorological observations have been commenced at some of the missionary stations.

There are two distinct seasons, viz., the hot or rainy, and the dry. The former, in which most of the rain falls, lasts from November to May, and the latter during the rest of the year. The rains seldom last long, but fall very heavily, and with the thunder which accompanies them proceed regularly from east to west—towards the Atlantic. In the dry season the sky is often cloudless for months together; but, as a rare occurrence, it has happened that, even in this part of the year, rain has fallen not only in Herero-land, but also in the interior, on the highlands of the north-western Kalahari and the Omaheke. The meteorological phenomena near the Atlantic coast are in many respects analogous to those on the west coast of South America. The cold Benguela current, coming from the south, is the cause of the very low temperatures observed there; Walvish Bay, for example, having an average annual temperature of 63° Fahr., and often bitterly cold nights. Cold mists rising from the sea at night-time, and saturating everything with moisture, are of regular occurrence along the coast, to which, however, they are limited, very seldom being met with at Otjimbingue and other places more in the interior. To a certain degree these mists are the only substitute for the rain, which is almost entirely absent in the desert coast-region. This absence is due chiefly to the west and south-west winds, which blow regularly for a longer or shorter period every day, and carry inland the little moisture which rises from the cold Benguela current, so that no rainfall near the coast is possible. But also the more eastern districts receive only irregular supplies of rain from this moisture, as the winds blow during the day, when the heat of the ground is usually very great, and, therefore, produces an upward current of air, so that thunderstorms and heavy rains are the chief characteristics of the wet season, as we have seen. It appears from this that no definite distinction should be made between the meteorology of the central parts of Herero- and Nama-lands and that of the Kalahari Desert, as the winds are not desiccated by passing over high mountain ranges, but are without sufficient moisture from the above-mentioned circumstances. The scarcity of rains in the Kalahari is owing chiefly to its greater distance from the Atlantic; but that thunderstorms and heavy rainfalls do occasionally occur in the eastern parts of the country, even in the neighbourhood of Lake Ngami, is recorded by various travellers. With

regard to the distribution of the rainfall, it may be remarked that more falls in the northern than in the southern parts of South-West Africa; and near the Orange River there are certain districts which are said to be entirely rainless. (*To be continued.*)

CENSUS OF THE UNITED KINGDOM, 1891.

THE Tenth Census of the United Kingdom was taken on Sunday, 5th April 1891. Its leading features are illustrated by the following extracts, which have been taken from the *Preliminary Reports*, presented to Parliament, including the Summaries of the Census Enumerators and Registrars.

The total population of the United Kingdom consisted, on April 6th last, of 37,740,283 persons. This was an increase of 2,855,435 upon the enumerated population in 1881, and was equivalent to an average daily addition of 781 persons to the community throughout the decennium, the daily addition having been 931 in 1871-81 and 701 in 1861-71.

ENUMERATED POPULATION of the UNITED KINGDOM at SUCCESSIVE CENSUSES, 1821-1891.

	1821.	1831.	1841.	1851.	1861.	1871.	1881.	1891.
United Kingdom,	20,893,584	24,028,584	26,730,929	27,390,629	28,927,485	31,484,661	34,884,848	37,740,283
England, .	11,281,883	13,090,523	15,002,443	16,921,888	18,954,444	21,495,131	24,613,926	27,482,104
Wales, . .	718,353	806,274	911,705	1,005,721	1,111,780	1,217,135	1,360,513	1,518,914
Scotland, .	2,091,521	2,364,386	2,620,184	2,888,742	3,062,294	3,360,018	3,735,573	4,033,103
Ireland, . .	6,801,827	7,767,401	8,196,597	6,574,278	5,798,967	5,412,377	5,174,836	4,706,162

The decennial rate of increase was 8·2 per cent., and lower than in either of the two next preceding decennia, in which it had been successively 8·8 and 10·8 per cent. The falling-off in the rate of growth was shared by all the divisions of the kingdom, but unequally; the smallest decline of growth being in Wales, where the increase was only very slightly lower than it had been in the previous decennium, falling merely from 11·8 to 11·6 per cent.; while the greatest change was in Ireland, where the population declined no less than 9·1 per cent., the decline in the two previous decennia having been respectively 6·7 and 4·4 per cent.

INCREASE or DECREASE PER CENT. of the POPULATION in SUCCESSIVE INTERCENSAL PERIODS.

	1821-31.	1831-41.	1841-51.	1851-61.	1861-71.	1871-81.	1881-91.
United Kingdom,	15·0	11·2	2·5	5·6	8·8	10·8	8·2
England, . . .	16·0	14·6	12·8	12·0	13·4	14·5	11·7
Wales, ...	12·2	13·1	10·3	10·5	9·5	11·8	11·6
Scotland, . . .	13·0	10·8	10·2	6·0	9·7	11·2	8·0
Ireland, . . .	14·2	5·5	−19·8	−11·8	−6·7	−4·4	−9·1

NOTE.—Where no minus sign is prefixed the figures denote an increase.

The population of England and Wales now forms 72·8 per cent., or nearly three-quarters of the total population of the United Kingdom, the proportion borne by it having increased uninterruptedly in each successive decennium. The population of Scotland constitutes 10·7 per cent. of the whole, which was also the proportion borne by it at each of the two preceding enumerations. On the other hand the inhabitants of Ireland, who in 1821 and 1831 were nearly one-third of the aggregate population, now form only 12·5 per cent., or one-eighth of it.

PROPORTION PER CENT. of the POPULATION residing in DIFFERENT PARTS of the KINGDOM.

	1821.	1831.	1841.	1851.	1861.	1871.	1881.	1891.
England, . . .	54·0	54·5	56·1	61·8	65·5	68·3	70·6	72·8
Wales, . . .	3·4	3·4	3·4	3·7	3·8	3·8	3·9	4·0
Scotland, . .	10·0	9·8	9·8	10·5	10·6	10·7	10·7	10·7
Ireland, . . .	32·6	32·3	30·7	24·0	20·1	17·2	14·8	12·5

The population of the Isle of Man, which in 1881 was found to have declined 0·9 per cent. in the preceding decennium, is now returned as 55,598, showing an increase of 2,040, or 3·8 per cent. A similar change has occurred in the case of Jersey. For here also there was a decline of 7·4 per cent. between 1871 and 1881, whereas the present population, numbering 54,518, shows an increase in the decennium of 4·0 per cent. In Guernsey the population which in 1881 had increased by 6·4 per cent. now shows a further increase of 8·3 per cent., and numbers 35,339 persons. It is only in the small islet of Alderney that there has been any decline in the last decennium, but the inhabitants of this islet are so few, only 1843, that this change scarcely affects the aggregate for the islands in the British seas, which has increased 4·7 per cent., and consists of 147,870 persons:—

POPULATION of the ISLANDS in the BRITISH SEAS enumerated at each of the Censuses, 1821 to 1891.

	1821.	1831.	1841.	1851.	1861.	1871.	1881.	1891.
Islands in the British Seas,	89,508	103,710	124,040	143,126	143,447	144,638	141,260	147,870
Isle of Man, ...	40,081	41,000	47,975	52,387	52,469	54,042	53,558	55,598
Channel Islands:								
Jersey, ...	28,600	36,582	47,544	57,020	55,613	56,627	52,445	54,518
Guernsey (with Herm and Jethou), . .	20,339	24,540	26,698	29,806	29,850	30,685	32,638	35,339
Alderney, ...	No return	1,045	1,038	3,333	4,932	2,738	2,048	1,843
Sark, ...	488	543	785	580	583	546	571	572

ENGLAND AND WALES.

Speaking generally, the counties in which the rates of increase were highest are counties which are largely affected by the presence of London, namely, Essex, Surrey, and in a lesser degree, Middlesex and Kent; or counties in which coal-mining is the predominant industry, such as Glamorganshire, Monmouthshire, Durham, and Northumberland. Then follow the manufacturing counties; while last of all come the rural counties, with rates of increase far below the general average, or with actual decrease. Of the fourteen counties that show a decrease, ten, namely, Brecknockshire, Pembrokeshire, Radnorshire, Montgomeryshire, Cardiganshire, Cornwall, Huntingdonshire, Rutlandshire, Herefordshire, and Shropshire, also showed declines in 1881.

There was a decline in no less than nine of the twelve Welsh counties; but, notwithstanding this, so great was the growth in Glamorganshire, that the rate of increase for Wales as a whole was almost precisely the same as for England.

The population of London, meaning thereby the London of the Registrar-General, which, with an insignificant exception,[1] coincides with the administrative County of London, was 4,211,056, showing an increase of 395,512, or 10·4 per cent. upon the population of 1881. Thus the population of London increased in a somewhat lower ratio than the population of England and Wales as a whole; and the fact is notable, inasmuch as it is the first time that such a phenomenon has presented itself, London having been found in every preceding intercensal period to have gained more or less in its proportions as compared with the country at large.

Year of Enumeration.	Population in England and Wales and in London at the Ten Enumerations.		
	England and Wales.	London.	Persons in London to 100 in England and Wales.
1801 . .	8,892,536	958,863	10·78
1811 . .	10,164,256	1,138,815	11·20
1821 . .	12,000,236	1,378,947	11·49
1831 . .	13,896,797	1,654,994	11·91
1841 . .	15,914,148	1,948,417	12·24
1851 . .	17,927,609	2,362,236	13·18
1861 . .	20,066,224	2,803,989	13·97
1871 . .	22,712,266	3,254,260	14·33
1881 . .	25,974,439	3,815,544	14·69
1891 . .	29,001,018	4,211,056	14·52

The total number of persons returned as living in England and Wales at 12 p.m. on April 5th, 1891, was 29,001,018. This shows an increase of 3,026,579, or of 11·65 per cent., upon the number returned at the previous enumeration of April 1881.

[1] The civil parish of Penge is included in the administrative County of London, but not in Registration London.

Not only was this increase absolutely less than that of the preceding decennium, 1871-81, but the rate of increase was lower than in any previous decennial period in the century, that is, in any decennium since the first enumeration in this country.

Date of Enumeration.	Population.			Increase of Population since last Census.	Decennial Rate of Increase per Cent.
	Persons.	Males.	Females.		
1801, March 10th, .	8,892,536	4,254,735	4,637,801	—	—
1811, May 27th, .	10,164,256	4,873,605	5,290,651	1,271,720	14·30
1821, May 28th, .	12,000,236	5,850,319	6,149,917	1,835,980	18·06
1831, May 29th, .	13,896,797	6,771,196	7,125,601	1,896,561	15·80
1841, June 7th, .	15,914,148	7,777,586	8,136,562	2,017,351	14·52
1851, March 31st, .	17,927,609	8,781,225	9,146,384	2,013,461	12·65
1861, April 8th, .	20,066,224	9,776,259	10,289,965	2,138,615	11·93
1871, April 3d, .	22,712,266	11,058,934	11,653,332	2,646,042	13·19
1881, April 4th, .	25,974,439	12,639,902	13,334,537	3,262,173	14·36
1891, April 5th, .	29,001,018	14,050,620	14,950,398	3,026,579	11·65

Had the rate of increase remained as it was in 1871-81, the addition to the population would have amounted to 3,729,929, whereas it was in reality only 3,026,579; and, as official estimates of the population in the years following on an enumeration are based on the hypothesis that the preceding intercensal rate of growth has been maintained, the estimated population in April 1891 was 703,350 in excess of the actual population. Such differences between estimates of this kind and reality are unavoidable when the interval between two consecutive enumerations is so long as a decennium.

The growth of a population is determined by two factors, firstly, the balance between births and deaths, and secondly, the balance between emigration and immigration. Of these two, the former is in this country always a cause of increase, for the births invariably outnumber the deaths; while the latter is always a cause of decrease, for the emigrants are invariably more numerous than the immigrants. Such at any rate has been the case since 1851.

The recent decline in the rate of growth may, therefore, be due to either of two causes, namely, a falling-off in the excess of births over deaths, that is, in the "natural increment," or to an increase in the excess of emigrants[1] over immigrants. As a matter of fact, it was due to both these causes, acting in combination.

For had the excess of births over deaths, or natural increase, been in the same proportion to the population as it was in the preceding decennium, the addition to the population from this cause would have amounted to 3,919,543, whereas it was in fact only 3,630,761, so that there was a falling-off of 288,782 under this heading. Again, had the

[1] "Emigrant" as used in this report includes:—(1.) Emigrants proper, that is, persons who have left the country to establish themselves outside Europe. (2.) Persons who have gone abroad as travellers, etc. (3.) Persons who have migrated from England and Wales to other parts of the United Kingdom. (4.) Any persons who died in the decennium, but whose deaths were not registered at the date of the enumeration.

"Immigrant" of course is used to include the opposites of these groups.

loss by excess of emigrants borne the same proportion to the population as in 1871-81, the decrease under this heading would have been only 189,614, whereas the figures show that it must have amounted to no less than 604,182.

These two deficiencies, namely, the 288,782 from diminished natural increase and the 414,568 from increased excess of emigrants, together make up the 703,350, by which the enumerated population falls short of the number estimated on the hypothesis of a maintenance of the preceding intercensal growth.

The decline in the natural increase was not due to increased mortality, for the mean annual death-rate in 1881-91 was lower than in any earlier decennium, but to a persistent decline in the birth-rate, which, as the following table shows, was unprecedentedly low :—

Intercensal Periods.	Increase per Cent. by Births.	Decrease per Cent. by Deaths.	Gain per Cent. by excess of Births over Deaths or Natural Increase.
1841-51 . .	34·64	23·73	10·91
1851-61 . .	36·19	23·58	12·61
1861-71 . .	37·56	23·98	13·58
1871-81 . .	37·89	22·80	15·09
1881-91 . .	34·26	20·28	13·98

It is only, however, as compared with 1871-81 that the natural increase shows any decline; as compared with any earlier decennium, it is still in excess.

As regards the increased loss from excess of emigrants over immigrants, there are no means of ascertaining with accuracy in what degree it was due to increased emigration and in what, if any, to diminished immigration. This much, however, is certain, that emigration was excessively active during the decennium, for while the number of persons of English or Welsh origin, who left the United Kingdom for places outside Europe in the interval between the enumerations of 1871 and 1881 was, so far as could be ascertained by the Board of Trade, 996,038, the number in the next intercensal period rose to 1,571,856. The loss to the population by the excess of emigration, amounted as already stated, to 604, 182, and, as the following table shows, was very considerably greater than the aggregate losses in the three previous decennia.

Census Years.	Population.		Difference—being loss by excess of Emigration over Immigration.	Increase* per Cent. in previous Decennium.		Difference—being loss by excess of Emigration over Immigration.
	As determined by Natural Increment only.	As actually Enumerated.		As determined by Natural Increment only.	As determined by actual Enumeration.	
1861	20,188,335	20,066,224	122,111	12·61	11·93	0·68
1871	22,791,234	22,712,266	78,968	13·58	13·19	0·39
1881	26,138,746	25,974,439	164,307	15·09	14·36	0·73
1891	29,605,200	29,001,018	604,182	13·98	11·65	2·33

* The rates of increase in this table refer to the intervals between the several censuses without correction for the very slight inequalities of the periods.

SCOTLAND AND ITS ISLANDS.

From the information now obtained we are enabled to state, that on the Census day of the present year the population of all Scotland, including those in the Royal Navy and belonging to the mercantile shipping in Scottish ports or on Scottish waters, amounted to 4,033,103 persons, of whom 1,951,461 are males, and 2,081,642 females.

Those numbers, when compared with the corresponding as enumerated at the Census 1881, show a total increase of 297,530, the male increase being 151,986, and the female 145,544. The percentage of increase of the population of Scotland during the last decennium has been 7·96, that of the male sex alone being 8·45, and of the female 7·52. These rates of increase, when compared with the corresponding of former periods, are found (with the exception for the decennium 1851-1861) to be the lowest recorded since the Census 1801-1811.

The population of Scotland is subdivided by the Registrar-General into five groups of Registration Districts, concerning whose population much tabular information is afforded in his various reports. They are —the Principal Town Districts, Large Town Districts, Small Town Districts, Mainland Rural Districts, and Insular Rural Districts, and a study of their numbers obtained at the two Census enumerations, 1881 and 1891, affords some information as to the movements now going on among the inhabitants of Scotland.

POPULATION of SCOTLAND in 1881 and 1891, arranged in Five Groups of Districts. (Including Shipping.)

GROUPS OF DISTRICTS.	1881.			1891.		
	POPULATION.			POPULATION.		
	Males.	Females.	Total.	Males.	Females.	Total.
PRINCIPAL TOWN DISTRICTS, . .	670,377	741,159	1,411,536	756,059	833,815	1,589,874
LARGE TOWN DISTRICTS, . . .	188,815	199,982	388,797	228,888	239,645	468,533
SMALL TOWN DISTRICTS, . . .	380,806	409,990	790,796	405,005	435,283	840,288
MAINLAND-RURAL DISTRICTS, . .	498,298	515,758	1,014,056	502,771	505,693	1,008,464
INSULAR-RURAL DISTRICTS, . .	61,179	69,209	130,388	58,738	67,206	125,944
SCOTLAND, . .	1,799,475	1,936,098	3,735,573	1,951,461	2,081,642	4,033,103

In like manner some particulars regarding the recent progress of each of the principal towns may be gathered, from which it is to be inferred that the rate of increase or decrease among them has varied considerably. The greatest change is indicated in Paisley and Aberdeen,

there being at the present Census an increase in their populations, in the former to the extent of 19·39 per cent. and in the latter of 16·02 per cent., when compared with what they were at the 1881 Census. In Glasgow the increase is at the rate of 10·62 per cent.; in Edinburgh, of 11·46 per cent.; in Dundee, of 9·26 per cent.; in Leith, of 14·55 per cent.; in Perth, of 3·37 per cent.; in Kilmarnock, of 8·10 per cent.; and in Glasgow, Landward and Suburban, of 30·04 per cent. On the other hand, there is in Greenock a decrease at the rate of 4·97 per cent.

INCREASE or DECREASE of POPULATION in the Five Groups of Districts in Scotland between 1881 and 1891, and the Percentage of Increase or Decrease in Ten Years.

GROUPS OF DISTRICTS.	INCREASE OR DECREASE BETWEEN 1881 AND 1891.			PERCENTAGE OF INCREASE OR DECREASE IN 10 YEARS.		
	Males.	Females.	Both Sexes	Males.	Females.	Both Sexes
PRINCIPAL TOWN DISTRICTS, . . .	85,682	92,656	178,338	12·78	12·50	12·63
LARGE TOWN DISTRICTS, .	40,073	39,663	79,736	21·22	19·83	20·51
SMALL TOWN DISTRICTS, .	24,199	25,293	49,492	6·35	6·17	6·26
MAINLAND-RURAL DISTRICTS, . . .	4,473	–10,065	–5,592	0·90	–1·95	–0·55
INSULAR-RURAL DISTRICTS	–2,441	– 2,003	–4,444	–3·99	–2·89	–3·41
SCOTLAND, . . .	151,986	145,544	297,530	8·45	7·52	7·96

POPULATION (according to Registration Districts) in the PRINCIPAL TOWNS of SCOTLAND in 1881 and 1891. (Including Shipping.)

TOWNS.	1881. POPULATION.			1891. POPULATION.		
	Males.	Females.	Total.	Males.	Females.	Total.
GLASGOW, . . .	248,366	263,049	511,415	277,645	288,069	565,714
EDINBURGH, . . .	107,006	127,396	234,402	119,237	142,024	261,261
DUNDEE, . . .	62,347	80,108	142,455	68,968	86,672	155,640
ABERDEEN, . . .	48,231	56,845	105,076	56,087	65,818	121,905
GREENOCK, . . .	34,302	32,514	66,816	31,758	31,740	63,498
LEITH, . . .	30,357	30,486	60,843	34,872	34,824	69,696
PAISLEY, . . .	25,838	29,800	55,638	30,665	35,762	66,427
PERTH, . . .	13,854	15,902	29,756	14,113	16,647	30,760
KILMARNOCK, . . .	12,607	13,257	25,864	13,649	14,310	27,959
GLASGOW, LANDWARD AND SUBURBAN,	84,994	89,579	174,573	109,065	117,949	227,014

INCREASE or DECREASE of POPULATION in the PRINCIPAL TOWNS of SCOTLAND between 1881 and 1891, and the Percentage of Increase or Decrease in Ten Years.

TOWNS.	INCREASE OR DECREASE BETWEEN 1881 AND 1891.			PERCENTAGE OF INCREASE OR DECREASE IN 10 YEARS.		
	Males.	Females.	Both Sexes	Males.	Females.	Both Sexes
GLASGOW,	29,279	25,020	54,299	11·79	9·51	10·62
EDINBURGH,	12,231	14,628	26,859	11·43	11·48	11·46
DUNDEE,	6,621	6,564	13,185	10·62	8·19	9·26
ABERDEEN,	7,856	8,973	16,829	16·29	15·79	16·02
GREENOCK,	–2,544	–774	–3,318	–7·42	–2·38	–4·97
LEITH,	4,515	4,338	8,853	14·87	14·23	14·55
PAISLEY,	4,827	5,962	10,789	18·68	20·01	19·39
PERTH,	259	745	1,004	1·87	4·68	3·37
KILMARNOCK,	1,042	1,053	2,095	8·27	7·94	8·10
GLASGOW. LANDWARD AND SUBURBAN,	24,071	28,370	52,441	28·32	31·67	30·04

IRELAND.

4,706,162 persons (2,317,076 males and 2,389,086 females) were returned in the Enumerators' summaries as constituting the population of Ireland on the night of Sunday, the 5th of last April—thus showing a decrease since 1881 of 468,674 persons, or 9·1 per cent. The decrease in the number of males was equal to 8·5 per cent., and in the number of females to 9·6 per cent.

The number of inhabitants in each of the provinces and in all Ireland in 1841, 1851, 1861, 1871, 1881, and 1891 respectively, and the decrease between 1881 and 1891, are shown in the following statement:—

PROVINCIAL SUMMARY of the last Six Decennial Enumerations.

PROVINCES.	NUMBER OF PERSONS IN						INCREASE OR DECREASE BETWEEN 1881 AND 1891.		
	1841.	1851.	1861.	1871.	1881.	1891.	Increase.	Decrease.	Rate per Cent.
Leinster,	1,982,169	1,682,320	1,457,635	1,339,451	1,278,989	1,195,718	...	83,271	6·5
Munster,	2,404,460	1,865,600	1,513,558	1,393,485	1,331,115	1,168,994	...	162,121	12·2
Ulster,	2,389,263	2,013,879	1,914,236	1,833,228	1,743,075	1,617,877	...	125,198	7·2
Connaught,	1,420,705	1,012,479	913,135	846,213	821,657	723,573	...	98,084	11·9
Total of Ireland,	8,196,597	6,574,278	5,798,967*	5,412,377	5,174,836	4,706,162	...	468,674	9·1

* Including 403 persons at sea on Census night of 1861 who were returned upon English shipping forms only.

The decrease of population in Ireland between 1871 and 1881 amounted to 4·4 per cent. as against 9·1 per cent. between 1881 and 1891; in the province of Leinster the decrease between 1871 and 1881 amounted to 4·5 per cent., between 1881 and 1891 to 6·5 per cent.; in the province of Munster the decrease between 1871 and 1881 was 4·5 per cent., between 1881 and 1891 it was 12·2 per cent.; in the province of Ulster the decrease between 1871 and 1881 was 4·9 per cent., between 1881 and 1891 it was 7·2 per cent.; and in Connaught it was 2·9 per cent. between 1871 and 1881, and 11·9 per cent. between 1881 and 1891.

There was an increase between 1881 and 1891 in the population of two counties—viz., Dublin, which increased 2·4 per cent., and Antrim, 1·4 per cent.

There was a decrease in the population of all the other counties, ranging from 16·2 per cent. in Monaghan, 14·5 in Tipperary, S.R., and 13·9 per cent. in Longford, to 8·1 per cent. in Londonderry, 7·7 per cent. in Kildare, and 1·9 per cent. in Down.

Of the total population in 1891, 75·4 per cent. were returned as Roman Catholics; 12·8 per cent. as Protestant Episcopalians; 9·5 per cent. as Presbyterians; and 1·2 per cent. as Methodists.

TABLE showing the Population of Provincial Towns having, in 1881, a Population exceeding 10,000, with the Increase or Decrease in Population between 1881 and 1891.

TOWNS.	POPULATION.		INCREASE OR DECREASE IN POPULATION BETWEEN 1881 AND 1891.		
	1881.	1891.	Increase.	Decrease.	Rate per Cent.
Belfast,	208,122	255,896	47,774	...	23·0
Cork,	80,124	75,070	...	5,054	6·3
Limerick,	38,562	37,072	...	1,490	3·9
Londonderry,	29,162	32,893	3,731	...	12·8
Waterford,	22,457	21,693	...	764	3·4
Galway,	15,471	13,746	...	1,725	11·1
Newry,	14,808	13,211	...	1,597	10·8
Kilkenny,	12,299	11,024	...	1,275	10·4
Drogheda,	12,297	11,812	...	485	3·9
Wexford,	12,163	11,541	...	622	5·1
Dundalk,	11,913	13,207	1,294	...	10·9
Sligo,	10,808	10,110	...	698	6·5
Lurgan,	10,755	11,447	692	...	6·4
Lisburn,	10,135	9,517	...	618	6·1
Armagh,	10,070	8,303	...	1,767	17·5
Total,	499,146	536,542	37,396	...	7·5

The population of Dublin City, which in 1881 numbered 249,602, amounted in 1891 to 254,709, showing an increase of 5,107, or at the rate of 2 per cent.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

Geodetic Measurements in Russia.—In 1857 Wilhelm Struve, founder of the Pulkova Observatory, entered into negotiations with Prussia, Belgium, and England, with a view to the measurement of an arc of a parallel of latitude stretching across the four countries. The Governments named consented, in 1863, to communicate the results of their measurements to Otto, son and successor of Wilhelm Struve, in order that he might co-ordinate them with the Russian triangulation. The measurement of the arc is not yet completed, but some particulars have been published concerning the work. The parallel chosen is that of 52° N. lat., and the angular extension of the arc is 69° 30′. The portion which lies within the bounds of Russia in Europe measures rather more than 1682 miles in length, and gives the average length of a degree of longitude as about 42·68 miles. The geodetic measurements prove beyond a doubt that the length of a degree is not always the same, that, in fact, the parallel of 52° is not a circle, but is composed of elliptical arcs. Bases of 4 to 9 versts have been measured with such care as to reduce the limit of error to the hundredth part of a millimètre, yet the lengths of a degree of longitude in different parts of the parallel show differences ranging up to 410 feet. It is expected that the measurement of the arc will be continued across Siberia to the Pacific.—*Boll. della Soc. Geog. Italiana*, Fasc. vi. 1891.

Russian Poland: Statistics of Population.—The Statistical Committee of Warsaw has made calculations relating to the population of Russian Poland and its distribution in the towns and villages. No census has yet been taken in this or any other province of the Russian Empire, but the registers that have been kept since the commencement of the century allow a fairly accurate estimate to be made. On 1st January 1890 the total population of Russian Poland was 8,256,562, exclusive of the army. As the area of the country is 49,157 square miles, this number gives a density of 168 per square mile. On the western side of the Vistula the density is 207 per square mile, and on the eastern only 137. Industrial activity being greater than in Russia, there is naturally a greater condensation of the population in large towns. The urban population numbers 1,464,807, or 17·7 per cent., while in Russia it is only 13 per cent. There are 107·6 women for every 100 men, and even if the army be included, estimated at 68,000, the ratio will still be 105·8 to 100. Two towns have more than 100,000 inhabitants (Warsaw, 443,426; and Lodz, 125,227), one has about 50,000, five from 20,000 to 30,000, and thirteen between 20,000 and 10,000.—*Le Tour du Monde, Nouvelles Géog.* p. 197.

Italian Soundings in the Ionian Sea.—In *Cosmos*, vol. x. No. 7, Professor Cora publishes a table of soundings taken in 1886-87 on board the *Washington*, under the direction of the Royal Marine. A depression was discovered on the 36th parallel of N. latitude and between the 18th and 19th meridians of E. longitude, in which soundings of 2217, 2218, and 2223 fathoms were taken. To this depression, the deepest in the Mediterranean, Professor Cora has given the name of *Abisso Magnaghi*, in honour of the Italian Hydrographer. The note is accompanied by a bathymetrical map.

ASIA.

The Khevsurs of the Caucasus.—Monsieur V. Dingelstedt has published some notes on this singular people in *Le Globe*, tome xxx. No. 2. The name is derived from the Georgian word *Khévi*, signifying a mountain gorge, and is unknown among the people to whom it is applied. They call themselves after the different localities they inhabit, not by any collective name. Their country is situated to the east of the Pass of the Cross, on both slopes of the central chain of the Caucasus, to the west and north-west of the mountain Borbalo, and has an area of about 570 square miles. Its mean altitude is over 6500 feet, and it contains peaks rising above the limit of eternal snow, which in the central part of the Caucasus is at an elevation of 10,600 feet. About 7000 persons inhabit this wild region, in a bleak climate, where the cultivable soil is of small extent and the vegetation poor. In the summer the Khevsurs feed cattle and sheep on the rich grass which springs up on the mountain slopes, but in the winter forage is difficult to obtain, and the animals and their owners often succumb to famine. The Khevsurs, in contrast to the other mountaineers of the Caucasus, are plain in appearance, of rather short stature, and with large hands and feet, though they are muscular and agile. A great variety is observable in the colour of their eyes and hair, their stature, and even in the form of their skulls, and this diversity may be ascribed to a mixture of race. Their original ancestors were probably Georgians, who, sometime before the 12th century, took refuge in the mountains. These were probably joined by men of other races, who, for various reasons, were obliged to fly from their native lands, or were attracted by the life of brigandage which the Khevsurs led up to recent times. Their Georgian ancestors had reached a fairly high standard of civilisation, but in their savage solitudes the Khevsurs have relapsed into semi-barbarism, and have now a fierce and defiant expression. They wear coats of mail, brassarts, and helmets, like cavaliers of the Middle Ages. They live in communities consisting of one or several villages, under the nominal authority of a chief called a *Khevisberi*. These villages are grouped around some spot supposed to be sacred to a saint, and this religious bond has taken the place of the old tribal unity. The Khevsurs have a vague belief in one God, but they never address Him in prayer, and their rites consist in sacrifices and invocations to various saints, Christian and pagan, among which Saint George is held in high repute. Most of the work falls on the women, while the men spend their time in idleness. Marriages are concluded either with Christian or pagan rites. The wife brings with her a dowry of cattle and a trousseau. The offspring of the cattle belong to the house of the husband, but the original herd is the private property of the wife, and any loss must be made good by the husband. The wife has no share in the property of her husband at his decease. It is divided among his male heirs, and, in default of these, passes to the community. So, too, the wife's property is divided among her sons, her trousseau only being left to her daughters. Monogamy is the rule, but custom permits a man to repudiate his wife when she grows old, or if she bears no children, and to take another, provided that he gives an indemnity of five or six cows to the parents of the former. In other cases divorce is easily effected, but is seldom resorted to. The dead are buried in vast caves. They are dressed in coats of mail, and sometimes musical instruments are placed in their hands. Festivals are held in their honour five times, or, in the case of poor families, twice a year, when there is a lavish display of hospitality and quarrels frequently take place.

Dutch New Guinea.—Several papers have appeared in *Cosmos*, giving the results of Heer F. S. A. de Clercq's cruise along the coasts of the Dutch territory. In

vol. x. No. 7, the district between the Bay of Tarfia and Humboldt Bay and M'Cluer Gulf are described. The Bay of Tarfia lies in about 140° E. long., and the country in the vicinity and also around the bays, Tanah Mera and Humboldt, as far as Cape Bonpland and the German frontier, is known as Papua Talanjang, its inhabitants being proud of their primitive condition and averse to changes. The coast of the Bay of Tarfia is flat, and only at some distance inland can a chain of mountains be perceived on the horizon. These are inhabited by the Monimbora tribe, who live on good terms with the Papua of the coast, but seem loath to intermarry with them. At the eastern extremity of the bay the land begins to rise, and the Bay of Tanah Mera is confined by hills of red chalk, 200 and 300 feet high, behind which rises the mountain Dafonto. Humboldt Bay is also enclosed by hills attaining an elevation of barely 600 feet, and to the east may be descried some lofty mountains. The natives are well built, and have well-developed muscles. They wear beards but no moustaches. The unmarried men wear no beards, and the children's heads are shaved. Adults wear a kind of crest of hair along the top of the head, and entwine flowers and feathers of birds of paradise in the hair which hangs down at the back. The women are not so ugly as those of Western New Guinea: they wear earrings of tortoise-shell, ornamented with beads, bits of shells, and mother-of-pearl. The only article of dress is an apron of bark. Their canoes are painted with black and white figures and adorned with carved heads of dogs and fishes. The paddles have oval blades and long handles. Almost all the houses are built over the water. A few brooks descend into the bay, but rivers are found only on the eastern side of the outer bay.

M'Cluer's Inlet extends a long distance inland on the western coast of New Guinea. It is not yet thoroughly explored, for ships usually visit only the inhabited part of the southern shore. The islands in it are very numerous, and the coast is for the most part rugged and precipitous. There is a good number of native settlements, many of them standing on the islands, on the side towards the mainland.

AFRICA.

The Sahara.—The *Bul. de la Soc. de Géographie Comm. de Paris*, tome xii. No. 2, contains two articles on the desert to the south of Tunis, and on the inhabited region lying between the French Territory and the Niger. M. Jean Dybowski, who is now with M. Crampel on the way to Lake Tsad, writes on the oasis of the Sahara. He affirms that the Sahara is, when irrigated, fertile in almost all parts, that the oases are not of natural origin, but have been made by the Arabs by means of irrigation from subterranean supplies of water, and that it would be possible to convert the greater part of the country into green pastures. He admits that a few tracts exist where the sub-soil is perfectly dry, and where, therefore, no cultivation is possible. M. Dybowsky notices that, as the French authority becomes more firmly established, the oases are neglected by the Arabs, and commerce declines. Biskra was formerly a busy commercial centre, but since the French occupation its commerce has declined, and the same fate has befallen, successively, Tuggurt and Wargla. The caravans avoid the oases under French rule, and turn aside to Morocco and Tripoli, partly because the Arabs prefer to trade with their co-religionists, but chiefly, no doubt, because the slave-trade is suppressed in the French territory. The decline in cultivation M. Dybowsky also attributes to the abolition of slavery, for the oases are full of swamps, which produce malarial fever. As soon, then, as this disease appears, the Arabs pack up and go to more healthy spots, leaving their negro slaves, who are not subject to attacks of fever, to attend to the palm-trees, which require to be watered all through the year. M. Dybowski

believes that colonies of free negroes might be established with the best results. El Goléa he considers to be a site peculiarly favourable for agricultural industry. Water is abundant, and proofs of former fertility are found in numerous vestiges of human habitations and remains of a fauna now extinct. M. Camille Sabatier gives some account of the inhabitants of Tuat, Ahnet, and Aderar, to accompany a map showing the density of population in the north-west of Africa. Both writers advocate the annexation of Tuat by the French. It lies to the south of their territory, and on the direct route to the French Sudan. Nine-tenths of the inhabitants of its 349 oases are Ksurians, who are sorely oppressed by the nomad tribes and look to the French for deliverance. The total population of Tuat is about 400,000. A short distance to the south commences the country of Ahnet, divided into three districts, Massin, Tegulgulet, and Inzize, and peopled by six to eight thousand nomads. It is only important as a stage on the way to the Sudan, well provided with water and forage and easy to fortify. One hundred and twenty-five miles from Ahnet lies Aderar, on a vast steppe overlooked by peaks, some of which attain a height of 5000 feet. The region of the gum-tree, which begins at Ahnet, here gives place to close vegetation, extensive pasturages, and forests peopled by large game. Up in the mountains lives the confederation of the Awélimmid, which, though only 40,000 to 50,000 strong, maintains a supremacy over the surrounding tribes, numbering 600,000 to a million. The rich pastures of this district feed innumerable troops of camels, humped cattle, sheep, and fine horses. The country is healthy and the climate salubrious, and in the hands of the French would form a sanatorium as well as a citadel. Thus, across Tuat, Ahnet, and Aderar lies a route through fertile country connecting Algeria with the Niger, but many years must elapse before it can be opened to European enterprise.

The Oil Rivers.—*The Times*, July 31st, 1891, in announcing the appointment of Major Claude M. MacDonald as Commissioner and Consul-General of the Oil Rivers, gives some account of the territory under his jurisdiction. His task is a rather difficult one, and will require great tact. The ground is not fresh, ready for the establishment of an administration, for the Rivers have been occupied for a century by English traders, who form a powerful organisation, and will probably be averse to the transfer of all administrative power into other hands. If the enactments of the recent Brussels Conference be ratified, the importation of spirits, now the staple currency of this part of Africa, must be suppressed, and in this work there will, no doubt, be great difficulties. The system under which the native chiefs exact money from the traders will be abolished, and the chiefs will be compensated by subsidies paid from the revenue. The new duties will be assimilated, as far as possible, to those levied in Lagos and Cameroons. Besides superintending the administration and judicial proceedings, it will be the duty of the Consul-General and the Vice-Consuls to develop the trade and industry of the country, experimenting with new crops, etc. The length of the coast-line of the Oil Rivers Territory is 350 miles, indentations being omitted. The country is low and unhealthy near the coast, where the European factories are situated, but at no great distance inland mountains rise to a height of 3000 to 5000 feet. The limits towards the sphere of the Royal Niger Company, as well as on the Cameroons side, are not yet definitely fixed. The boundary on the German side has been provisionally laid down as running from the Rio del Rey to the Ethiope Falls on the Cross River, but the Rio del Rey is only a creek with numerous branches, which are as yet unexplored, and the precise course of the boundary will be the subject of fresh negotiations. Most of the British merchants trading on the Oil Rivers, including many well-known firms in Liverpool and Glasgow, have formed themselves into a corporation, styled the

African Association. The value of the imports into the Oil Rivers for the three years ending 1889 was estimated at £730,000 per annum, but trade has increased considerably since then, and prices have risen. The exports of 1889 were valued at £1,300,000, and they promise to be fully as large in the present year. Palm oil is the principal article of export. Palm kernels are gaining in importance, rubber comes from Old Calabar, and ebony to the amount of 1000 tons is annually exported. The cultivation of coffee and cocoa has been commenced.

The Cross River.—Through the courtesy of the Secretary of the Palmerston Place Church Missionary Society we are able to give a few details concerning an expedition to the Upper Cross River, made by the Rev. James Luke, in January 1890. In 1842 the *Ethiope*, under the command of Captain Beecroft, ascended the river as far as the rapids, a little beyond the 9th meridian of E. longitude, to which the Anglo-German boundary, as defined by the treaty of last year, runs from the coast, and in 1884 the Rev. S. H. Edgerley, of the United Presbyterian Mission, steamed in the *David Williamson* to Alaha. An account of the latter excursion, by the Rev. Hugh Goldie, appeared in the *Scottish Geog. Mag.* vol. i. p. 275. At Adzösö, the first village above the rapids, the Rev. James Luke was heartily welcomed by the people, but he was struck by the absence of the elders of the community. The interpreter explained that the inhabitants of this village had driven back a boat's crew of the *Ethiope*, and that they feared lest they should be called to account for the deed. It is almost certain, then, that no white man had ascended beyond this point before. How far the Rev. James Luke travelled it is not possible to say. The furthest point is laid down on his map at about 9° 55′ E. long., but, having used no other instrument than the compass, he does not pretend to have ascertained more than the general direction of the river. From Adzösö it trends to the south-east, and, as the party advanced, navigation became more and more difficult, owing to rapids and rocks. At one place they were obliged to empty the boat and lift it over a shelf of rock, which ran quite across the river, and the next day they came to a rocky defile, where further progress by water was impossible. The party set out on foot, and scrambled for some hours over boulders and through bushes and furze, until they came to a halt before impenetrable thicket and an insurmountable chaos of rocks. Above the spot where they left the boat the direction of the river is northwards, and from the character of its bed and the quantity of water it contains Mr. Luke believes that its source is not far distant. The natives were everywhere friendly and delighted to see white men, of whom they had heard from the tribes lower down the river.

Madagascar.—M. d'Anthouard has recently crossed the island from Ambositra, capital of North Betsileo, to Morondava, on the west coast, and returned by the valley of the Tsiribihina to Antananarivo. The first part of the journey was accomplished without difficulty, though burnt villages betrayed the proximity of bands of brigands. The Bongolava chain was crossed, or rather descended, for it is simply the western slope of the central plateau. Where M. d'Anthouard crossed, near Malaimbandy, it is nearly 3000 feet high. At its foot lies an immense plain. Its soil, composed chiefly of alluvium, is light, but rich. Meadowland, where feed large herds of cattle, is abundant, and there are extensive forests, harbouring game. The Sakalava, who inhabit this low land, subsist on potatoes, manioc, and bananas, which grow luxuriantly without cultivation. From Morondava, or Nosy Miandroka, M. d'Anthouard proceeded in a boat to Tsimanandrafozana, at the mouth of the river Tsiribihina. This river is nearly 1000 yards broad at the mouth, and further up spreads to a still greater width, its bed being obstructed by sandbanks. It is navigable, at any rate from November to March, when the water is high, as far

as the foot of the Bongolava. It is formed by the union of two streams, the Mania, which flows directly from the east, and the Mahajilo, which rises not far from Antananarivo. These streams, each about 1000 yards broad, are also navigable when the water is high. The soil of this region is very argillaceous and less fertile than the country near the coast. Hollows, where water accumulates, forming lakes and marshes, are very numerous, and are a source of malarial fevers. At Imanadaza M. d'Anthouard reached the first Hova posts, and, crossing the Bongolava range, here 1600 feet high, came in five days to the nearest villages of Imérina.—*Compte Rendu*, No. 11, 1891.

Meteorological Observations in Madagascar.—The Rev. G. A. Shaw has communicated some notes on the meteorology of the east coast of this island to the Royal Meteorological Society (*Quarterly Journal*, April 1891). The observations were taken at Farafangana, or Ambàhy, in lat. 22° 49′ S., and long. 47° 58′ E. The climate is affected by the southern half of the equatorial Indian Ocean current, which has a breadth of 60 miles, and frequently produces north and north-easterly winds when southerly winds only are met with at a distance from the shore. One or two swamps on the west of the town also tend to modify the climate, absorbing during the night by evaporation the heat which has accumulated during the day. The barometer during the period of observation, August 1889 to July 1890, ranged from 29·94 inches, on March 3d, to 30·67 inches, on August 21st. The highest shade temperature was 94° Fah., on Jan. 7th. On the same day the greatest heat in the direct rays of the sun was registered, when the mercury in a black bulk thermometer *in vacuo* stood at 164°. The lowest minimum of the air, four feet from the ground, was noted on the night of November 7th, when the thermometer fell to 50°, and the lowest record of terrestrial radiation, 40°, was registered on July 30. The total rainfall was 145·34 inches. Rain fell on 181 days, the largest amount on any single day being 6·73 inches, on January 30th. January, February, and March were the wettest months, the fall in February being 25·14 inches. The driest were September, October, and November, only 1·5 inches being measured during the last of these months. North and north-easterly winds were the most frequent, blowing on 158 days, while east and south-easterly occurred on 134 days.

AMERICA.

Expedition to Greenland.—The *Bulletin of the American Geog. Soc.*, vol. xxiii. No. 2, and the *Deutsche Geog. Blätter*, Bd. xiv. Heft 2, contain communications from Mr. R. E. Peary, U.S.N., setting forth the aim and plan of his expedition, the departure of which was announced on p. 386. The party will land at Whale Sound and endeavour to reach the northern extremity of Greenland across the inland ice. Lieutenant Peary believes that this route will be found much more practicable than others, because it will be possible to follow a straight course, no detours being necessary to avoid tidal cracks and piles of ice blocks, and lighter sledges may be used on the even surface of the ice, with a consequently greater rapidity. The *nunataks*, moreover, will serve as secure places of deposit for stores, and will serve as landmarks, while the great elevation of the interior will facilitate the surveying of the coast and afford opportunities for discovering any more northerly lands which may exist. From the experience of former explorers Lieut. Peary believes that a sledging party should be few in numbers, and, therefore, he has selected only five companions, John M. Verhoeff, a mineralogist, Dr. Frederick A. Cook, and three men. The winter will be spent at Whale Sound in making sledges and in snowshoe and *skier* practice, and early in the spring four or

five of the party will start over the ice to Humboldt Glacier, and, after leaving a depôt of provisions there, will proceed to the head of Petermann Fjord, where another depôt will be formed. From this point the advance party of two or three will push on to the north, while the others return to Whale Sound and spend their time in meteorological observations, surveying, etc. The main party will proceed by Sherard Osborn and De Long Fjords, leaving depôts at both places. Lieut. Peary finds that the average speed of a number of sledge parties in the Arctic Regions was 18·48 miles per day, and calculates the distance from the south side of Humboldt Fjord to the northern extremity of Greenland, supposing the latter point to lie near the intersection of the 85th parallel with the 10th meridian of W. longitude, at 1219 miles. The time required for the journey is, therefore, 66 days. Lieut. Peary, however, believes that a higher rate of advance will be maintained on the inland ice, and, on the other hand, that the northern extremity of Greenland is at a lower latitude.

Niagara Falls.—Mr. John Bogart, State Engineer, has sent in a report concerning the recession of these falls. In 1842 Professor James Hall made an accurate survey, and, on comparison of his results with those of 1890, it appears that the annual recession at the American Fall has been 7·68 inches, and at the Canadian, or Horse-shoe Fall, 2 feet 2·16 inches. During this period the crest line of the American Fall has sunk from 1080 to 1060 feet, and that of the Canadian has risen from 2260 to 3010 feet. The area of rock which has been carried away during these forty-eight years is 32,900 sq. feet at the American, and 275,400 sq. feet at the Canadian, Fall.—*Bull. of the American Geogr. Society*, vol. xxiii. No. 2.

United States: The White and Coloured Population of the South.—The abnormal increase of the coloured population in what is known as the Black Belt, as shown by the census of 1880, led to the belief that the Negroes were increasing at a much greater rate than the white population, and to settle this important question a race count has been made in the South Atlantic and South Central States, and in Missouri and Kansas, in advance of the main work of tabulation. The result shows that the apparent increase of the coloured in proportion to the white population must be ascribed to omissions in the census of 1870. The total population in the States mentioned is 23,875,259, of which 16,868,205 are white, 6,996,166 coloured, and 10,888 Chinese, Japanese, and Indians. In 1880 the white inhabitants of these States numbered 13,530,408, and the coloured 6,142,360. Whereas, then, the former increased by 24·67 per cent. during the decade, the latter increased by only 13·9 per cent. The proportion of coloured persons to white, which in 1880 was 45,397 : 100,000, had fallen in 1890 to 41,475 : 100,000. In *Census Bulletin* No. 48, from which these particulars are extracted, a table is given showing the numbers and increase of the two races for each decade since 1780. From this it appears that only from 1800 to 1830 did the Negroes increase more rapidly than the Whites, and that since the latter date the rate of increase of the white population has been steadily growing as compared with that of the coloured. As the States under consideration, with the exception of Kansas and Missouri, have received few immigrants during this period, either from foreign countries or from the Northern States, the change cannot be due to the influx of Whites from outside. It is, therefore, evident that the coloured race cannot hold its ground against the white, even in a region where the climate and other conditions are best suited for its development. An inspection of tables of population in the individual States shows that there has been no extensive northward movement of the coloured element since the civil war, but that the border States have lost rather

than gained, while during the last decade there has been a perceptible movement southwards, particularly into Mississippi and Arkansas. Of the States under discussion three, namely, South Carolina, Mississippi, and Louisiana, contained in 1890 a larger number of coloured people than white. In South Carolina more than three-fifths of the inhabitants are coloured.

Costa Rica: The Volcano of Poás.—M. H. Pittier devoted several days in August last year to an examination of this volcano. It stands about 19 miles to the north-west of San José, and has been formed by successive elevations, each of which has produced a new crater. Of the three craters now existing, that which is probably the oldest lies at an elevation of 8400 feet, only 250 feet below the summit. It is now filled with water, forming a beautiful lake 1500 feet in diameter. The temperature of the water is 52° to 55° F. and is pleasant to the taste, though the streams that supply it are to some degree impregnated with sulphur. The surplus waters are carried off by the river Angel, which emerges at the north-western point of the basin. The second crater has been almost obliterated by the formation of the third, the actual vent of the mountain. This crater, lying between the two others, is an extremely deep cavity, with walls perpendicular on all sides except at two points where a descent may be made. At the bottom is a lake, 250 feet in diameter, at an elevation of 7470 feet above sea-level. Frantzius, in 1861, found the temperature of the water to be 102° F., and M. Pittier recorded a maximum temperature of 180°. At intervals the water near the northern shore becomes agitated, and presently an immense column of muddy black water rises up and falls back into the lake, causing violent waves to dash against the shores. The abyss is then veiled by dazzling white vapours, which rise to a height of many hundred feet. In 1888 M. Pittier thought that these explosions might be due to infiltration from the river Angel, but careful measurements executed with the assistance of M. Menardo Reyes proved that no such infiltration takes place, a result in harmony with the fact that the wall of division between the river and the crater must be at least 800 feet thick.—*Bull. of the American Geogr. Society*, vol. xxiii. No. 2.

The Geology of Barbadoes.—A paper on this subject, by A. J. Jukes-Browne and Professor J. B. Harrison, was read before the Geological Society in April last (see *Quarterly Journal*, No. 186). After discussing earlier notices on the geology of the island, the writers state that the basal part of the island consists of stratified rocks, chiefly dark sandy clays and sandstones. Resting unconformably on these is a series of light-coloured and chalky-looking deposits, some of which are calcareous and others mainly silicious. They are all of deep-sea origin, and include the well-known Infusorial or Radiolarian earth. Lastly, a crust of coral limestone of very varying thickness covers a large portion of the surface of the island. In a chapter on *The Coral-Reefs now Growing* observations are cited, from which it is concluded that coral can grow up from a depth of 25 or 30 fathoms. Secondly, it is shown that there are always deposits of coral *débris* and calcareous sand in front of the lowest reefs, which may accumulate to a depth of 20, 30, or even 50 feet before any living coral grows upon them; but, when raised to the surface, this formation would differ from reef rock only in the absence of large masses of solid coral. Thirdly, the configuration of the bottom of the sea generally takes the form of terraces, so that the terraced form of the raised reefs may be partly due to their original construction and not always to erosive action. These dicta seem to hold good of the raised reefs also. The thickness of the reef-rock does not often exceed 200 feet, the base being always formed of a certain depth of coral mud, sand, or breccia. The detrital rock at the base of the reefs seems to have been accumulated

on a slope outside an older reef: its thickness varies from 1 up to 40 or 50 feet. The reefs appear to have been formed during periods of rest or very slow upheaval, succeeding shorter periods of rapid upheaval, each of these movements having brought up a lower slope to within the limit of coral growth. A large amount of information is also collected in this paper on the raised coral-reefs of other West Indian islands, and the physical geography of the Caribbean Sea at the time of their formation is discussed, the evidence produced showing that the islands have risen contemporaneously with Central America, and that in early Pleistocene time the continents of North and South America were separated. The absence of the Gulf Stream, which is a necessary consequence of such a conformation of land and sea in this region, would suffice to account for the extreme rigour of the Glacial Period in the British Islands. The article from which this short note is taken is full of interesting information, and the text is elucidated by several sections and illustrations of limestone specimens.

Dredgings in the Pacific Ocean.—Three letters from Alex. Agassiz, published in the *Bulletin* of the Museum of Comparative Zoology, give some interesting particulars of the expedition of the *Albatross*. The deep-sea fauna in the neighbourhood of Panama is poor compared to that of the eastern shores of the continent. Probably this poverty is due to the absence of a great oceanic current, bringing supplies of food. West Indian forms preponderate. The southern slope of the Galapagos also did not yield the rich fauna that was expected, though it lies in the track of a great current from the south. A gigantic *Ostracod*, more than an inch long, was dredged up between Cape San Francisco and the Galapagos and also in the Gulf of California.

MISCELLANEOUS.

On Sunday, June 21st, the first section of a **Railway in Tongking**, from Phu-Lang-Thuong to Lang-Son, was opened.

An official report of the progress in exploration and political settlement achieved by the administration of the **Congo Independent State** is published in a special number of the *Mouvement Géographique* (16th July 1891).

Anton Jussef Lutfy Bey, in a note read before the Société Khédiviale de Géographie in March last, proposed the construction of a **Railway between Egypt and Syria**. Its length, from Ismailia to Tripoli, would be about 370 miles.

The *Imperial and Asiatic Quarterly Review*, July 1891, contains a useful article by Captain T. G. de Guirandon on the progress made during the last few years in the **Study of African Languages**. Lists are given of works on the various languages.

M. Macan, a Belgian, has obtained a concession for a **Railway from Samsun, on the Black Sea, to Sivas**, with permission to extend the line to the Gulf of Alexandretta. The total length of this line, which will connect the Black Sea and the Mediterranean, will be about 1100 miles.—*The Times*, June 3d.

We have received the second volume of the *Reports* presented to the **Fourth International Congress of Geographical Sciences**. The Reports it contains deal with the labours of the various nationalities of Europe in the field of Geography. Général Derrécagaix also contributes an interesting article on European Topographical Maps.

NEW BOOKS.

Die Theorieen über die Enstehung der Koralleninseln und Korallenriffe und ihre Bedeutung für geophysische Fragen. Von Dr. R. Langenbeck. Leipzig: Verlag von Wilhelm Engelmann, 1890. Pp. 190.

This work may be described as an elaborate exposition in defence of Mr. Darwin's theory of coral reefs by a German scientist, and as such it will receive serious attention in this country. For the thoroughness of research displayed in its pages, and for the able handling of a large mass of conflicting data, Dr. Langenbeck's contribution stands amongst the foremost of the recent additions to the literature of the subject. He is able to point to the recent support given by the two eminent geologists, Professors Suess and Neumayr, to the theory of Darwin and Dana; yet his widening the field of the controversy, by including a discussion as to whether the land or the sea is the unstable element, can scarcely be said to strengthen Darwin's original view. In fact, Dr. Langenbeck considers it as immaterial to the theory of subsidence whether we conceive a sinking of the land or a swelling of the sea; and, whilst reviewing the subject, he leaves this important matter an open question until the closing chapter, when he discusses the theory of Suess of an alternate heaping-up of the oceanic waters at the Equator and the Poles, and decides in favour of the instability of the earth's crust.

The author commences his criticisms of the views of Semper, Agassiz, Murray, and the other opponents of the theory of subsidence, by ruling that the very regions that raised many of these hostile witnesses (the Philippine Islands, the West Indies, the Floridas, the Solomon Group, etc.) present very different conditions for coral-reef formation than are found in the areas to which Darwin and Dana applied their explanation. This is virtually an admission that the theory of subsidence is no longer what it was intended to be and universally accepted as, viz., a general explanation of the origin of coral reefs. It has, in fact, only a partial connection with the subject as a whole; and if the labours of Agassiz, Murray, and others had only resulted in bringing about the recognition of this fact, they would have been amply rewarded. The investigation of those complex conditions under which a coral reef is built, of the difficult biological, chemical, and physical questions involved, could scarcely be expected in a work like that of Mr. Darwin, which dealt only with the subject from a single standpoint. From this circumstance, therefore, Dr. Langenbeck's criticisms of the occasional discordant opinions of the opponents of Darwin lose much of their force. We are at present only beginning to have an insight into the nature of the problem to be solved; and if Dr. Langenbeck and the other supporters of the theory of subsidence claim certain features in the structure of oceanic atolls as supporting their views, it is not improbable but that they may be in a measure right. But the admission that a subsidence of the earth's crust might explain certain features in oceanic atolls by no means implies that this is an important factor in the matter. Certainly, it has little to do with the general subject of reef-formation.

However, dismissing the more controversial part of this work, it will be regarded for its treatment of the purely geological aspect of the question, and for its excellent account of the present distribution of coral reefs, which is, in fact, one of the most extensive compilations of the kind yet published, as well as for the masterly yet courteous handling of a somewhat thorny subject, as conveying much instruction to both sides in this discussion.

Die Denudation in der Wüste und ihre geologische Bedeutung. By Professor Johannes Walther. Leipzig: S. Hirzel, 1891. Pp. 570.

The author, who has travelled much in the Egyptian deserts, and whose work on the coral-reefs of the Red Sea is well known, gives in this volume an admirable account of the manner in which desert regions are denuded. He shows that the Egyptian deserts, although they are practically rainless, have yet suffered extensive erosion. This destructive work he attributes chiefly to the sun and wind—a view which, of course, is not novel, but the precise *modus operandi* of these two agents is explained and illustrated by Professor Walther in such a manner as to throw much additional light upon a subject which most geologists, perhaps, have been under the impression was already sufficiently understood. The author points out that the alternate heating by day and cooling by night to which rocks in the desert are exposed, result in wholesale desquamation and disintegration of the surfaces, which greatly facilitates the chemical action of water. But as dry winds and sun-heat soon suck up any rain or dew, chemical action plays a very subordinate part in the demolition of the rocks. Indeed, it is only in places where rock-surfaces are sheltered from the direct action of the wind and sun that traces of that action become apparent. Weathering of this kind, which is so common in regions like our own, has in a practically rainless desert a very limited development. In like manner the disintegrating action of plants is necessarily at a minimum. The rock-materials, broken up by the action of insolation, are borne along by the wind and used as a sand-blast to attack and erode the rocks against which it sweeps. This has hitherto been supposed to be the chief work performed by the wind, but, according to the author, it is as a transporting agent that wind plays the most important part in the denudation of a desert. The disintegration of rocks in a desert is confined to their exposed surfaces, and were "deflation" or the transporting action of the wind to cease, denudation would quickly come to an end. But in a region destitute of vegetation the wind tends to carry all loose material away from the scene of its origin to the borders of the desert. This action goes on without ceasing, day and night, and during all seasons, and the result is seen in the deeply eroded rocks—enormous masses of which have been gradually disintegrated and carried away. In the rocky deserts evidence of denudation is conspicuous on every hand, but the products of the denudation have been removed. Here are great walls of granite rising to heights of 6000 feet, but showing no slopes of débris below, as would infallibly be present under temperate climatic conditions. There, again, are deeply excavated Wâdis, containing no beds of gravel and grit, such as would not fail to show themselves had the depressions in question been formed by water action. Everywhere deep cave-like hollows have been excavated in the rocks, and yet these hold no loose materials, but are swept bare. Again, over the plains mushroom-shaped rocks and hills are of common occurrence. All these appearances are due to deflation. Insolation, weathering, and the sand-blast are merely the servants of deflation. They are the silent miners, the author remarks, who hammer and drill the rocks day and night to prepare loose materials which are swept away by the winds. One of the most interesting parts of this monograph is that which deals with the configuration of the surface in desert regions. The writer shows that the forms assumed by the rocks is due partly to their petrological character. Thus, granite hills, under the action of the wind, are readily distinguished from hills of sandstone; but the forms that result from such action differ essentially from those that are the result of denudation in other lands. Thus we see in desert regions projecting rock-masses that resemble the ice-worn hillocks of glaciated tracts, but on closer inspection we find no rough lee-side.

Granite hills, again, frequently show jagged sharply-notched summits and crests, strongly resembling the characteristic features of the Dolomite mountains of South Tyrol. Another characteristic work of deflation is the production of plains of denudation—features which are of common occurrence in the desert. The products of denudation come in for considerable discussion by the author. He shows that these are of various kinds. In the rocky deserts quantities of rock-débris are met with. These mark the first stage in the desert-formation. Locally they attain considerable development, the blocks and stones being partly angular, partly rounded. But away from the rocky wastes the "deflation plains" are encountered, where the superficial accumulations are composed of gravel, sand, or loam. In places the gravel is rounded, in other places it is sharply angular, the rounding being due to the action of the sand-blast, while the angular character results from the splitting of the stones by insolation. The sand is made up chiefly of the quartz; the loam or clay of the decomposed felspar of disintegrated crystalline rocks. The intimate structure of the accumulations in the sand- and clay-deserts is not easily studied, but it is obvious those deposits must in many respects resemble formations which are common enough all the world over. Thus, a section through such desert-accumulations, were they to become solidified, would exhibit beds of sandstone with interstratified layers of clay and gravel; the sandstone would show much diagonal-bedding, while foot-prints, rain-pits, fossil wood, etc., would frequently appear. Have we any evidence, then, the author asks, of fossil deserts? Do any of the formations of this and other countries (which have usually been attributed to the action of water) really owe their origin to wind action? The study of this extremely interesting work would certainly lead us to conclude that "insolation" and "deflation" may have played a much more important *rôle* in the past than has hitherto been believed. But geologists have already recognised the wind-blown origin of certain sandstones, such as the Bunter Sandstones of England, and certain of the Carboniferous Sandstones of Scotland appear likewise to be Æolian formations, so that wind as a prominent geological agent of change has not been ignored. From Professor Walther stay-at-home geologists, however, will get many hints and much assistance in trying to understand the full meaning of wind-denudation. We confess to some doubt as to whether all the rock-erosion described by the author is attributable wholly to wind and its allies. There seems to be strong evidence to show that the now desert regions of North Africa were formerly well watered. The Wâdis (however much they may have been subsequently modified by deflation) have the systematic arrangement of valleys which have been excavated by rivers, and the beds of some of those in the Libyan Desert are described as being paved with water-worn shingle and gravel. Were Central Europe to become a desiccated region, the present features, which are due to the action of rain, rivers, frost, etc., would in time be greatly modified by wind—but the configuration assumed by the land would not be the result of wind-denudation alone. The hills, bared of vegetation, and their rocks exposed to surface disintegration, might well be worked over by the winds in such a way as gradually to assume the aspect which is peculiar to the hills of a desert region. One is inclined to suspect, therefore, that the wind-sculptured hills described by Professor Walther existed as hills before the desiccation of North Africa had commenced. But, however that may be, the author has put it beyond doubt that erosion on a large scale has been effected by deflation alone, and we can strongly recommend his work to the attention of all who are interested in the subject of the origin of the earth's surface features, and of the various modes in which sedimentary accumulations have been elaborated. The work, we may add, is illustrated by eight plates, which show the action of insolation, weathering, the sand-blast,

deflation, etc., and the character of the desert sands. There are also numerous illustrations scattered through the text.

Historic Towns. Edited by Edward A. Freeman, D.C.L., and Rev. William Hunt, M.A. *New York*, by Theodore Roosevelt; and *Boston*, by Henry Cabot Lodge. New York and London: Longmans, Green, and Co., 1891. Pp. 232, 3 Maps and Index; and 242, 2 Maps and Index. *Price* 3*s.* 6*d.*

These two volumes, although both welcome additions to the series, differ considerably in their method. Mr. Roosevelt has written about New York city only, while Mr. Lodge has gone far outside Boston, and produced what is as much a history of New England as of its metropolis. Consequently the former's book is much the more satisfactory. He is master of a clear, vigorous style, and he has used skill and judgment in his selection of materials. His work sketches rapidly, but with sufficient fulness for all the purposes of the general reader, the history of the great city that has now long since stretched its arms beyond Manhattan Island, and far up past the Harlem River. Here we see its rise carefully and intelligently traced, from the little port where privateersmen and pirate captains swaggered in their chains of gold and jewelled daggers, through the years when it was an important political centre, the home of the Federalist party, to its present prosperity as one of the world's great trading-towns. But Mr. Roosevelt probably regards New York as of most interest as an experiment in democratic government; and, strong as his hopes are for the future, he is anything but blind to the blunders and corruption that have disgraced the city's past history. We cannot share all his confidence when he says, "If the citizens can be thoroughly waked up, and a plain, naked issue of right and wrong presented to them, they can always be trusted." Surely this would appear to be contradicted by the history of the past year or two? Some exception might also be taken to his remarks on Fulton, and his praise of the Seventh New York Regiment as "by all odds the best regiment in the United States Militia" is quaintly extravagant. However, all this is not geography, and we may gladly overlook such trifles, and thank Mr. Roosevelt for a bright, clear, useful history of his city. The same, with more modified enthusiasm, may be said of Mr. Lodge's book. There seems to be too much of the colony, and space is wasted that might have been filled with more interesting matter about the city. Even the part it has played as a literary centre is scarcely spoken about. But, for all that, Mr. Lodge has made an interesting volume; it is not all about Boston, but it will well repay perusal.

The Normans, told chiefly in relation to their Conquest of England. By Sarah Orne Jewett. London: T. Fisher Unwin, 1891. Pp. xv + 373. *Price* 5*s.* ("Story of the Nations" Series.)

The present volume is to be judged, not as a scientific, but rather as a popular, work. The chief faults to be found with it affect presumably the editor of the series, though we are not quite sure of this, because the writer is aware of them, and sees fit to make a sort of apology for them. Bearing in mind the other books of the series that have already appeared, one would have expected a story of the Northmen or Vikings, which might or might not have included a story of the Normans, correctly so called—*i.e.* the Scandinavians who colonised Normandy, and sent forth the conquerors of England and Sicily. But the present book is neither the one nor the other; it is, on the contrary, a piecemeal production, embracing a piece of the history of the Northmen or Vikings, a piece—a large piece—of the history of the

Normans, and a piece of the history of England. The title best answering to the contents of the book would be "History of the Norman Conquest of England"; out of the total of 370 pages 200 are taken up with a description of the life and deeds of William the Conqueror. A true history of the Normans ought to include an account of the doings of the De Hautevilles in Italy and Sicily. In this book this portion of Norman history is dismissed in less than twenty pages. A history of the Vikings ought to embrace an account of the doings of the sea-kings in Shetland, Orkney, Faerö, Iceland, Ireland, England, Flanders, France, Bjarmeland, Novgorod, and away down to Miklagaard (Byzantium). All this is done in fifty pages, and the greater part of it is not alluded to at all. Then again, does not the history of William I. and William II. (with whose death, curiously enough, the book concludes) belong to the "story of England"? Altogether, we must confess ourselves at a loss to understand what is the *nation* whose story it is professed to tell in this volume.

Taking what we have got, however, we gladly acknowledge that the author has produced a readable book. She has honestly endeavoured to depict the life, and customs, and sentiments of the age she deals with, and writes with a good knowledge of the facts, and in a very agreeable style, which in many passages becomes even imaginative or picturesque, as the case may be. The best parts of her work are perhaps the account of William's invasion; and the account of the feudal chivalry, its customs, manners, and beliefs, is interesting. She of course follows Mr. Freeman; but it is a pity she did not discard his pedantic "Eadward" and "Aelfred." Why did she not write also "Hrolf," "Harald," "Baudewyn," and so forth, especially as she prefers Cnut to Canute? There are numerous illustrations and a couple of maps.

The Voyages and Adventures of Ferdinand Mendez Pinto, the Portuguese. Done into English by Henry Cogan. With Introduction by Arminius Vambèry. "The Adventure Series." London: T. Fisher Unwin, 1891. Pp. xxxii +464. *Price 5s.*

When the adventures of Mendez Pinto first became known to English readers—now well-nigh two hundred and thirty years ago—they were not accepted as authentic, and the oft-repeated sneers at "tales of a traveller" met the publication almost universally. But inquiry and scientific analysis of the contents of the volume showed, in time, that what the traveller had to tell was substantially fact and worthy of sufficient credence to make his collections useful to the geographer and the student of manners and customs of a past age singular for the stirring history of its adventurous voyages. Pinto, it cannot be denied, frequently exaggerated and as frequently fell into mistakes; but, looking to the stormy nature of his life and the opportunities he had for observation, the work is one of undoubted value and entertainment. This is an abridged edition, and the editor has done the work of curtailment in a singularly satisfactory manner—the omissions generally being confined to the long, dry, and florid orations of questionable authenticity with which the original Portuguese and English editions were overloaded. Probably no other narrative places before us in the same vivid light the hardships, the perils, and the wild life of the mariner of the sixteenth century, as well as the fanatic conduct of Christian and Turk and the merciless reprisals they made one upon the other. In a purely geographical sense this volume is the best of the "Adventure Series" yet issued.

The illustrations accompanying this edition number six, and are taken from *The Voyage of John Huyghen Van Linschoten to the East Indies* (1586-92),

from original drawings by that voyager. They are remarkably quaint, and, although Linschoten came a generation after Pinto, are of value as illustrating the works of the earlier navigator, and are more useful and appear to better advantage than is generally the case with such borrowed embellishments.

A Cruise in an Opium Clipper. By Captain Lindsay Anderson. London: Chapman and Hall, 1891. Pp. 240. *Price* 6*s.*

This is an amusing and instructive sketch of a state of things of every-day life as it existed on the coast of China thirty years ago. After the opium war the "drug" became the centre round which everything revolved, and, whatever the trade may have been, it ought to have the credit of doing much to open the Empire of China to merchants, military, and missionary alike. During two hundred years the empire stood still. Trade was for long confined to Canton, and the opium was brought from India to the mouth of the Canton River, where receiving-vessels were moored for the purpose of keeping it, or the silver paid for it, in safety until it was sold or removed. At this time there appears to have been no objection made to it on the part of the Chinese Government; the vessels being at times permitted to lie inside the Bogue, and allowed to do so free of "measurement duty."

Being a cargo of great value either as opium or as silver, the small vessels were of necessity well found and heavily armed, to defend them against attacks of pirates or unscrupulous neighbours; but these precautions were never taken against the Chinese custom-house, as the numerous runners in the service of the Government prevented any possibility of smuggling illegally one bale of opium. The vessels engaged in the trade required to be fast, strongly built, of no great size, well found, well armed, to escape by sailing or repel by force any attempts that might be made upon them. So that a cruise in an opium clipper was pretty sure to afford some interesting event either in weather or chance adventure, whether in risk during summer of a typhoon, during winter of beating against the north-east monsoon, or pirates at any time.

In 1859 the author shipped at Shanghai as third-officer on the *Eamont*, a small schooner or brigantine built for the trade by Messrs. Dent & Co. The passage down to Hong-Kong seems to have been quickly made. They found that, instead of being sent to one of the well-known receiving ships up the coast, the house had received some intimation of a new market having been opened somewhere about the south end of Formosa by some of the rivals who were now and again trying to divide the spoils. Many a time such a thing was attempted, and some young house would secretly send up a cargo; but as soon as one of the large houses got an inkling of the venture, prices were dropped to such a ruinous figure that the new-comer was glad to sell out and escape with as much of his cargo as he could abstract. The object on this occasion was to find out if there was any truth in the story, and if any other vessel was trading at some hitherto unknown port.

The southern part of the Formosa channel is not a nice place to be cruising about in the typhoon season in search of a break on the coast, and without knowing even the name of the place one is going in search of. The Pescadores islands and rocks are enough to make an old sailor alarmed, but to cruise up and down along the coast inside of these requires a bold heart and a clear head.

Takow was the place aimed at, but the captain seemed to have little or no indication of its whereabouts, as the neighbouring coast seemed to have been quite unsurveyed. After sailing up and down for four days they saw two men on one of the catamarans, made of bamboos, and used in Formosa, and by a sharp manœuvre the boat was got out, and cut off the men from the land. From these men they

ascertained that there was a break in the line of coast, and that by a narrow passage between two small hills junks were in the practice of passing out and in. These natives acting as pilots, the schooner was driven at what they said was the deepest channel, and after bumping twice on the hard sand the *Eamont* was safely moored at the bay and harbour inside, known since as Takow, near Ape's Hill. Here the measure of their success and daring was gratified by finding two foreign vessels lying in a landlocked harbour. They produced the cargo with which trade was to be commenced, and forthwith an animated interchange of goods commenced.

However, the landlocked harbour proved very deceptive, a typhoon commenced to blow, a junk broke loose, and was driven down on the *Eamont*, then the Dutch schooner was blown out to sea and thrown on the beach. Then followed an attack of native wreckers, who, in China, never show the smallest mercy to the wrecked, and the whole party had a narrow escape with their lives, after losing several men.

Altogether the book gives a very fair account of the excitement connected with trade in the China seas, whether furious storms, hidden rocks, or treacherous and cruel natives.

New China and Old: Personal Recollections and Observations of Thirty Years. By the Ven. Arthur E. Moule, B.D., C.M.S. Missionary in Ningpo, Hangchow, and Shanghai, and Archdeacon in Mid-China. With thirty-one Illustrations. London: Seeley and Co., Limited, 1891. *Price* 7*s.* 6*d.*

The author went out to China in 1861, when, as he says, "China was old and decrepit, clinging tightly to her established *régime* and to her ancient traditions." During a residence of thirty years, he saw the empire slowly awakening from its long sleep, and on every hand symptoms of life and energy, growth and progress, which have astonished the world. With the help of Admiral Hope, General Gordon, and Captain Dew, and a native army officered and trained by Europeans, the Taiping rebellion was crushed, as well as the insurrections in Kashgar and Yunnan. China has now large arsenals, a formidable fleet, and a standing army largely trained on European models. While describing the onward progress of the Chinese, the author gives most interesting information on the many questions relating to the habits and thoughts of this people,—questions which are but imperfectly understood by Western readers. Buddhism and Taoism, ancestral worship, superstitions, language and literature, are all touched upon, and in a manner which shows much careful thought and minute observation. We have rarely seen things pertaining to the social life of the Chinese so well described.

Travels in Africa during the Years 1879-83. By Dr. Wilhelm Junker. Translated from the German by A. H. Keane, F.R.G.S. Illustrated. London: Chapman and Hall, Limited, 1891. Pp. viii + 477. *Price* 21*s.*

We have already noticed the first volume of this set of travels in vol. vi. (p. 442); the present is the second volume, embracing the journeys of the years 1879-83. The regions traversed by Dr. Junker during these years were in part perfectly new: he himself was the first European whom many of the natives ever saw. Having joined Gessi Pacha, governor of the Bahr-el-Ghazal province of the Egyptian Sudan, Dr. Junker struck southwards, throwing himself upon the protection of Ndoruma, the powerful chief of the cannibal Niam-Niam. From his camp he proceeded still further south, crossed the Welle-Makua, and visited the

Mangbatu (Monbuttu) chief Mambanga, and then made an expedition to the east as far as Tangasi. He next spent several months amongst the A-Madi and A-Barmbo tribes living between the forked arms of the Upper Welle-Makua. The book breaks off with his arrival at the camp of a chief named Bakangai, between 26° and 27° E. long., and 2° and 3° N. lat. It abounds in interesting descriptions of native life amongst tribes who are perhaps the most interesting of all Negroes. Indeed, we have no hesitation in saying that the value of this set of travels is unsurpassed by any recent African publications. The text is illustrated by a great number of woodcuts, and there is a very useful map, though it would have been more useful if Dr. Junker's itinerary had been plainly indicated by a coloured line. The translation is excellent.

The Ancient Gold Fields of Africa: From the Gold Coast to Mashonaland. By J. M. Stuart. London: Effingham Wilson and Co., 1891. Pp. 312.

This is merely a collection of passages strung together from various writers on the gold-fields of Africa, from the Gold Coast round to Mashonaland. There are several nicely tinted plates and reproductions of old maps. In 1889, the author published an account of the Gold Fields of Eastern Africa; the present volume completes his survey. It is bound in "cloth of gold."

The Dictionary of the Clyde from Tinto to Ailsa Craig. By David Pollock. With Five Maps. Pp. 284. *Price* 1*s.*

The Dictionary of the Forth from Abcrfoyle to Isle of May. By David Pollock, With Six Maps. Pp. vi + 274. *Price* 1*s.* Edinburgh, T. C. and E. C. Jack, 1891.

The first of these publications has now been for some time in the hands of visitors to the districts surrounding Glasgow, and as it has made a place and a name for itself as a thoroughly reliable and useful companion, it need only be stated here that it has been brought carefully down to date, and that several new articles have been added to this edition.

The Dictionary of the Forth, however, is an entirely new production, this being its first year of issue, and, therefore, demands more particular notice. Following closely, in plan, the companion volume, it is in every way its equal, and in some respects its superior. The editor has called in to his assistance various specialists, with the result that we have articles of great excellence, the result of painstaking and, to a large extent, original research, such as "Birds" and "Mammalia" by Mr. Eagle Clarke; "Botany," "Fish," "Reptiles," etc., by Mr. J. Arthur Thomson; "Geology" by Mr. Peach; "Physics of the Forth," by Dr. Mill; and various others, for whose names we must refer readers to the work itself. The editor has arranged the rubric with great skill, the number of cross entries is particularly large, and no item of information will be hunted for in vain, as is so frequently the case in works of the kind. The articles are, in general, remarkably full, containing all particulars that can reasonably be expected.

Both books are, in every respect, well produced, and accompanied by clear maps, not very large in size, but sufficient for the purpose they are intended to serve. We can recommend the volumes, not only to tourists, but to residents in the districts described, as the latter will find in them very desirable works of reference.

A Handy Guide to Edinburgh and its Vicinity. With Maps and Thirty Illustrations. By Wm. T. Dobson. Edinburgh : T. C. and E. C. Jack, 1891. Pp. iv + 79. *Price* 4*d.*

This little guide is exactly what it professes to be, viz. a useful companion to those who can make only a hurried visit to the city and its surroundings. The routes chosen in the city are principally along the tramway-lines. All buildings and objects of historical or antiquarian interest are briefly and clearly described. The clear illustrations form a marked feature in the publication, which is in all respects well produced.

Illustrated Guide to Perthshire. By Thomas Hunter. Perth : Robertson and Hunter, 1891. Pp. 196. *Price* 1*s.*

This guide has been brought down to date, and should prove useful to the tourist. It is handy in size, well printed, and fairly well illustrated.

The Comparative Climatology of London and the Chief English Health Resorts. By B. Thornton, M.R.C.S., etc. London : H. K. Lewis, 1891. Pp. 15.

This is a paper reprinted from the *Lancet*, and shows that the variations of climate are not so great as we are accustomed to imagine. The mean winter and summer temperatures, diurnal variation, average rainfall, and the number of rainy days of some thirty stations for six years are given, as well as a description of the sub-soil. The author calls attention to the fact that "the general aspect of a town and even of a single street or house is in many instances a mile of statistics." From this it follows that persons in search of British health-resorts would do well to obtain accurate information, and not to trust to the often garbled statements made with regard to fashionable places.

Jarrold's Norwich and Eastern Counties Handbook for 1891. Norwich : Jarrold and Sons. Pp. 336. *Price* 6*d.*

This volume will be found most useful to any one visiting the district either on business or pleasure, and to the inhabitants it must prove a necessary companion. It is well and clearly printed. An improvement, however, would have been the addition of a plan of the town and a map of the surrounding country.

The Eastern Alps, including the Bavarian Highlands, Tyrol, Salzburg, Upper and Lower Austria, Styria, Carinthia, and Carniola. Handbook for Travellers, by K. Baedeker. With 34 Maps, 9 Plans, and 7 Panoramas. Leipzig : Karl Baedeker, 1891. Pp. 504. *Price* 8 *M.*

This is the seventh edition, revised and augmented. A practical experience enables the writer to thoroughly recommend it and to compare it favourably with the other guides of this series. The contents of the handbook are divided into eight sections, so that any one of them *may* be detached, if required.

Meyers Konversations-Lexikon. Achzehnter Band. Jahres-Supplement, 1890-91. Leipzig und Wien : Bibliographisches Institut, 1891. *Price* 10*s.*

We have sufficiently pointed out the merits of this excellent work in our notices of the earlier volumes. The volume at present before us is the first annual supplement. It combines two features, in that it serves as a chronicle of the year in all the departments of knowledge, and at the same time supplies a number of articles overlooked in the body of the work. But this latter purpose—besides

being somewhat foreign to the title of the volume, an *annual* supplement—is not strictly carried out. Some articles that should have found a place in at least vol. xvii. do not yet appear even in this, *e.g.* Fr. Nietzsche. The geographical articles, our readers will be glad to know, are, so far as we have examined them, done with the usual thoroughness and care.

Johnston's Geographical Handbooks of General Geography—Scotland, Africa, and Australia. Edinburgh and London: W. and A. K. Johnston. *Price 3d. each.*

These are handy little books compiled to accompany the wall-maps issued by the same firm. They are clearly printed, and contain a large amount of information. Their form gives them a certain advantage over large text-books for use in schools.

Pantobiblion: International Bibliographical Review of the World's Scientific Literature. Editor: A. Kersha, C.E., St. Petersburg, 1891.

We have received the first monthly number of this periodical. It contains lists of new works on many different sciences, and written in all the principal languages of Europe. Some of the most important publications are specially noticed. The great difficulty is to find any desired subject. Books dealing with each subject are collected under a separate heading, but their place in the volume is not readily found. A brief alphabetical index would remove this difficulty.

The Handbook of British Honduras for 1891-92. By Lindsay W. Bristowe, of the Judicial Department, Notary Public. William Blackwood and Sons, Edinburgh and London, 1891. Pp. 265, and Map.

This handbook fully maintains its excellence, and forms a comprehensive guide. It is well up to date, and supplies all the information likely to be required with reference to this flourishing colony. The care and detail with which the book has been compiled make it a valuable publication.

With Sack and Stock in Alaska. By George Broke, A.C., F.R.G.S. London: Longmans, Green, and Co. Pp. xi. + 158. 2 Maps. *Price 5s.*

This is a capitally written and unpretentious record of an attempt made in 1888 to scale Mount St. Elias. The description of the country is well done, and even of Sitka Mr. Broke finds something new to say. He and his party were experienced mountain-climbers, and the expedition appears to have failed mainly from the want of trained porters. Those who are interested will find on page 156 his reasons for defending the old height of 19,000 feet against the onslaught made by American surveyors last year. The map of the southern slopes of the mountain is of interest.

Costa Rica and her Future. By Paul Biolley, Professor in the College of San José. Translated by Cecil Charles. Washington: Judd and Detweiler, 1889. Pp. iv. + 96. Map.

This is a useful pamphlet if read with caution. The writer is an advocate as well as a professor, and the case he presents is too highly coloured; but much of his information is accurate enough, and about San José in particular he supplies some useful facts. The map is handy, but the translation is often very bad. "Lands and Cultures" is a curious chapter-heading, and the section on "Ways" had better have been called "Roads and Railways."

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE GEOGRAPHY OF SOUTH-WEST AFRICA.

(*Read at Meeting of British Association*, 1891.)

By Dr. Henry Schlichter.

(*Continued from page* 485.)

I shall say but little about the flora and fauna, as full accounts have already appeared about them. Concerning the former, I should like to refer to the excellent observations and descriptions given by Dr. Schinz in his recently-published book. There are two distinct kinds of vegetation, viz., that of the coast-region and that of the *Hinterland*, a division which is in close relationship with the before-mentioned meteorological variations in these parts of the country. The former is composed of *Pelargonia*, *Zygophyllum*, *Salsola*, *Ectadium*, *Mesembryanthemum*, *Aristida*, and other species, as well as the peculiar *Welwitschia* and *Acanthosicyos*; several kinds of Euphorbias forming a transition to the flora of the Interior. With reference to the latter, Pechuel-Loesche makes another distinction, viz., plants dependent chiefly on the rain, and the vegetation which requires a permanent underground water-supply for existence. As regards area, the former occupy by far the greater part of South-West Africa, most of the land having the character of steppes covered with grass and bushes. After rain has fallen, especially from January to May, many parts of the country are covered with vegetation but during the dry season show hardly any sign of vegetable life. Only where underground water is found do trees grow; and the land is therefore without forests, with the exception of that part near the Cunene where water is more plentiful, and forests consisting of *Copaifera*, *Berchemia*, *Terminalia*, and *Gardenia* trees are found. Four species of trees, three of which belong to the acacias (*A. erioloba*, *horrida*, and *albida*), are the representatives of the under-

ground-water vegetation throughout the country, whilst the fourth, the Omumborombonga of the Ovaherero (*Combretum primigenium*) is much rarer and does not grow south of the Tsoachaub. The *Adansonia* is found only near the Ngami and in Ambo-land. Of smaller trees, tamarisks (*Tamarix articulata*) and the so-called ebony tree (*Euclea pseudoebenus*) should be mentioned.

The fauna has changed greatly during the last thirty or forty years, as such enormous numbers of all kinds of animals—especially antelopes, lions, buffaloes, rhinoceroses, giraffes, etc.—which were met with when the country was first explored, are no longer to be found in any part of South-West Africa, on account of their ceaseless slaughter by European hunters as well as by the natives since the latter have possessed breech-loading guns. The most important animal, the elephant, has almost disappeared from the countries in question, and is found only in the neighbourhood of Lake Ngami; but even there it has become much less numerous, and the time has gone by when, as Andersson reports, 1200 pounds of ivory could be bought at Lake Ngami for a musket. This is not to be wondered at, if we consider that, according to Livingstone, in three years not less than 900 elephants were killed near the Zouga River alone; and how much their number has diminished is shown by the present very small ivory export from Walvish Bay, which amounts to about 1500 lbs. per annum, whilst in 1875 it was as high as 37,000 lbs. Most of this ivory comes from Ambo-land, and elephants are still found occasionally in the northern and north-eastern parts of Damara-land, and even in the Kaoko, but these are only single specimens which have migrated from the more eastern countries. There is no doubt that the number of various kinds of animals would increase again if some protective measures were taken in this respect; and we have already stated that, *e.g.*, near Grootfontein, thousands of antelopes and other animals have been found since this district was deserted on account of the war between the Hottentots and Ovaherero. Reptiles, especially snakes and lizards, are found in a great variety of species; crocodiles live in the Cunene and Okavango, but not in the Orange River. Locusts (*Gryllus devastator* and other species) are at times a great plague to the country. The tsetse is found only in the most eastern districts, and oxen may therefore be employed almost everywhere in South-West Africa as draught-cattle. Two kinds of termites should be mentioned: the Cape termite, occurring in Great Nama-land, with the exception of the coast region; whilst *Termes bellicosus* does not live south of Damara-land.

The population of South-West Africa is very sparse considering the vast area of the whole territory. It consists of very different tribes, viz., Hottentots and Bushmen, Bastards and Hill Damara, and various Bantu tribes, of which the Ovaherero and Ovambo are the most important.

The southern parts of South-West Africa are chiefly inhabited by the Nama or Namaqua, who, as is well known, together with the Koranna (living more to the east), have the collective name of Hottentots. Hahn and Olpp have shown that "Namaqua" is not their proper name, and the expression Nama is therefore now generally adopted instead. They must be divided into three groups, viz., the Topnaar,

Orlam, and Nama proper. The Topnaar are of subordinate importance; they live in the neighbourhood of Walvish Bay, Sandwich Harbour, and Cape Cross; are poor, and near Sandwich Harbour subsist chiefly on fish. At Walvish Bay they make themselves useful as labourers, and have improved considerably under European influence. Their entire number hardly amounts to 400. The Orlam are tribes of much greater importance. They have immigrated from Cape Colony into Great Namaland, and have driven the original inhabitants more to the east. But in the course of time they have mixed considerably with them, so that to-day it is difficult in many instances to draw strict ethnographical distinctions between them. These wanderings across the Orange River did not take place only in the last century and at the beginning of the present, for we know from the earliest travellers who visited South Africa that even for a long time previously the restless Hottentot tribes of Cape Colony were accustomed to migrate towards the north. The Orlam form the most active element of the Nama nation, and several of their chiefs, especially Jager and Jonker Africaner, were, as is well known, the terror of South Africa, on account of their waging continuous war with all their neighbours and of the cruelties committed by them. We will not go into details; it is enough to say that Jonker and his tribe at one time subjugated the whole of South-West Africa from the Orange River to the Cunene, and that he had a perfect right to style himself the king of Nama-, Damara-, and Ambo-land. The inhabitants of Bethany, Bersaba, Gobabis, and Gibeon are chiefly Orlam; whilst those of Hoachanas, Haruchas, and Keetmanshoop belong to the original inhabitants of the country. the Nama proper, to whom belong the Veldschoendrager, Bondelzwart, Franzmann, the Red Nation, etc.

Most of these Hottentots, to the total number of about 10,000, lead the restless life of nomads and hunters, cattle-rearing and agriculture being the occupations of only a small proportion of them; but constant quarrels and feuds amongst themselves, or wars against the Ovaherero, have brought this once powerful nation to the brink of ruin. Since the commencement of this century missionaries have done their best to improve the state of the Nama and to induce them to lead a regular life; but, with very few exceptions, they have not succeeded, as the natives almost always returned to their unsettled mode of life after the lapse of some time. They might have become a valuable part of the population, as they are intelligent and not at all disinclined to European civilisation; but it is very questionable whether they will relinquish their bad habits, which become, of course, constantly worse, as long as the incessant wars continue, in which the most atrocious cruelties are committed, although, according to the missionary statistics, more than one-third of the Nama profess to be Christians. Calling themselves the "yellow people," they despise all their black neighbours; and since they have become possessed of modern fire-arms they are a constant danger to the peaceful development of the country. The question of the origin of the Hottentots is, in spite of the many efforts of Bleek, Lepsius, Hahn, Fritsch, Schinz, and others to discover it, still unexplained, and it appears as if it would never be solved conclusively. Bleek has tried to show that the Hottentots in

former times migrated from East Africa southward, and afterwards were driven westward by Kafir tribes; but to assume that they came from the Red Sea, and to identify their name with the Hadendoa, as Olpp has done, is entirely hypothetical. Schinz is inclined to regard them as a bastard race, between the San and an extinct race of light colour, and Fritsch has expressed a similar opinion; but neither can this assumption be supported by any substantial arguments. To add to the difficulty, the Hill Damara speak the same language as the Hottentots, but are of entirely different appearance, viz., black and somewhat similar to the Negro tribes of West Africa; so that it is hardly possible, so long as no fresh proofs are forthcoming, to form any conclusions about the origin of the Hottentots or their relation to the other inhabitants of South Africa.

The Ovaherero, who live north of them in the country east of Walvish Bay and in the northern Omaheke, are a totally different race. They are Bantu, and their language differs but little from those of more northern nations. There can be no doubt that the Ovaherero, not many centuries ago, migrated southward into their present country. Their total number amounts to about 100,000 souls, thus forming a much greater proportion of the population than the Nama. Their chief occupation is cattle-rearing, for which their country is well adapted, and their mode of life is similar in this respect to the Kafirs'. They were originally divided into two groups, the Ovaherero and Ovambundjeru, who are, however, now so greatly mixed that it is difficult to discover any distinction between them. "Damaras," as they are often named, is a Hottentot expression which is not used by the Ovaherero themselves. Omaruru, Otjimbingue, and Okahandja are the principal places in their country, Omaruru being the largest town, Otjimbingue the central trading-place, and Okahandja the residence of the most influential Ovaherero chief.

Formerly the Ovaherero were more powerful, and Andersson heard, *e.g.*, at the Ngami, that the Damara frequently visited this lake, making war on the Bechuana living there. But now they are weakened by the different wars with the Hottentots. It seems that these wars commenced as far back as the beginning of our century, even before Jonker Africaner was asked by the "Red Nation" to assist them against the Damara, as Schmelen, already in 1814, was prevented by war from entering the Damara-country, coming from Great Nama-land. Jonker's victories over the Ovaherero as well as over his rivals amongst the Hottentots are well known. Shortly after his death (1861) the war broke out again, and lasted with varying fortune till 1870, when through the influence of Hahn peace was concluded. Some years later Palgrave made treaties with the different Nama and Ovaherero chiefs, and friendly relations seemed to exist everywhere. But a quarrel between some servants of Maharero, the late Ovaherero chief, led to the foul massacre (1880) of most of the Hottentots who had settled in Damara-land, and the war consequently broke out afresh, interrupting Palgrave's peaceful mission. From all sides the Ovaherero were attacked by the Hottentots, but without much success. Hahn, who again tried to make peace, was this time unsuccessful; and when Hendrik Witbooi took the command of the Hottentots, he not only attacked the Ovaherero but also

those of the Hottentot chiefs who would not follow him, committing the most atrocious cruelties. Hendrik entirely disregarded the ultimatum sent to him by Dr. Goering, the German Imperial Commissioner, and his last attack on the Ovaherero was directed against Otjimbingue, the chief German settlement in Damara-land, which he burned down in September last in the presence of the German officials. It is expected that Germany will soon put a stop to this state of affairs, which ruins not only the Ovaherero and Nama, but also makes every effort for the development of German colonial enterprise impossible.

Scattered between Hottentots and Ovaherero, live the so-called Hill Damara or Haukoin, the number of whom is, according to Viehe, about 35,000. It is known that they are entirely without property, and, like the Bushmen, are treated as outlaws by the Damara and Hottentots. Their origin is unknown. The Nama language, as has already been mentioned, is spoken by them, but, as Pechuel-Loesche asserts, with variations and a different accent. They are a good and peaceful element of the population, willing to work, and glad to improve their poor circumstances. They live chiefly in the mountainous parts of Herero-land, especially the Erongo, Etjo, and Omuveroume mountains, as well as in the Kaoko and the source-region of the Black and White Nosop.

The Bushmen, who in the Kalahari lead a similar life to the Hill Damara, are at present but imperfectly known; and Schinz, who has studied them carefully, points out that they are often confounded with degenerate half-breeds of Hottentots, Hill Damara, Ovaherero, Bushmen, etc., whom Brincker calls Hottentot-Bushmen, and who are ethnographically totally different from the real Bushmen. Although of small stature they are somewhat taller than the dwarfs of Equatorial Africa, having an average height of 4 ft. 6 in., and are usually found in bands of from 300 to 400 people. Their total number is about 10,000. The asserted equality of their origin with the Equatorial dwarfs is not yet sufficiently proved; but it is most remarkable to learn that Schulz and Hammar met, on their journey from the Chobe to the Cubango river, a tribe called the Mossaro or Mossakere, who are of Bushman-like appearance and habits; and I consider it not impossible that they form the connecting link between the dwarfs of the north and the inhabitants of the Kalahari.

Bastards is the name given to about 2000 natives who formerly immigrated from Cape Colony, and are descendants of Europeans and Hottentots. They live in Great Nama-land at Rehoboth, Grootfontein, and many other places, but have suffered greatly during the present war. Many of them were obliged to leave their settlements, and we have seen, *e.g.*, that the fertile district of Grootfontein is at present entirely deserted. Nominally Christians, they are an industrious people who make a living by agriculture, cattle-rearing, or as wagon-drivers and hunters. They form decidedly the best and most civilised element of the population of South-West Africa.

Between Damara-land and the Cunene live the Ovambo, who, like the Ovaherero, are Bantu, and are divided into a number of independent tribes, viz., the Ovambo of Ondonga, the Ovakuambi, Ongandjera,

Ovakuengama, Ombandja-onene, and others. Their chief occupation is agriculture, cattle-rearing being of quite subordinate importance. Besides that, they are experienced in copper-smelting, forging, pottery, and other kinds of manufacture. Hahn reports that the Bushmen who work the Otavi mines sell at least fifty to sixty tons of copper ores annually to the Ovambo of Ondonga. These northern parts of South-West Africa are more populous than all the others, the total number of the Ovambo amounting to about 120,000.

It remains to add a few words about the natives near Lake Ngami, where two tribes especially have to be distinguished, viz., the Batovana, a Bechuana tribe which immigrated there in the first part of our century, and subjugated the original inhabitants, the Makoba or Bayeye. The occupations of the Batovana, who number only about 500, are hunting and cattle-rearing, but most of the work is done by the Bayeye, whom they treat like slaves, and who derive their chief subsistence from the produce of the soil. The total number of the Bayeye is about 10,000. East and north-east of these we find various settlements of Bakalaka, Makololo, Bakuena, Bakusa, and Barotse, whom we regard as representatives of different Bantu tribes. Their total number hardly amounts to 10,000.

Adding the different items given, we find that the whole population of South-West Africa is about 300,000 people—a very low figure for a vast territory like this.

The question of the value of South-West Africa for commercial and colonial enterprises has been frequently discussed in recent years, since Germany took possession of these countries. It is well known that the enterprise of Lüderitz was a failure; but this result was due to several unfortunate circumstances, and it would therefore be unfair to draw general conclusions from it. Practical experiments have been made on four different lines, and I will shortly summarise the results of them.

I. South-West Africa was long ago known to contain various valuable minerals, especially copper, which is found at many places between the Orange River and the Ambo country. I need only mention the Khuias, Matchless, and Otavi mines, which contain copper ores of great purity, and have been partly worked in former years. But the difficulty lies not in obtaining rich ores, but in the high cost of transport, as it is impossible to smelt the copper in the country itself, coal being entirely wanting. The well-known "Walvish Bay Copper Mining Company," which worked the Matchless mines, sent the ores in ox-wagons down to Walvish Bay, and the experience of a short time proved that this did not pay. The same is the case with all the other copper mines in the country so long as no railways exist; and it will be remembered also that the copper mines south of the Orange River were known long ago, but did not pay before rails were laid from Port Nolloth to Steinkopf and Ookiep. Even if gold should be discovered in sufficient quantities, it would want a much greater outlay of capital to make it pay than was supposed when the first rumours about South-West African gold reached Germany some years ago.

II. Agriculture is of some practical importance, more especially because

the climate is such that European colonists could live in many parts of the country. No doubt much more water could be obtained in Nama- and Herero-land by simple artificial means; but even if the most favourable conditions for agriculture on a large scale existed (which is not the case), there would not be sufficient demand in the country itself, and the export would meet the same obstacles as mining enterprises.

III. Cattle-rearing has proved profitable until quite recently, and large herds were driven to the markets of Cape Town and Kimberley. But since the railway has been built between these two places, there is no further demand for cattle coming from Great Nama- and Damara-land. Moreover, it is difficult to believe that the idea of bringing cattle to Walvish Bay, Sandwich Harbour, etc., to be slaughtered there, and to send the meat abroad, was ever taken up seriously, because the animals, after being driven through the desert region near the Atlantic, would arrive at the coast more or less unfit for slaughter, without finding any pastures, and in most places not even water.

IV. There remains the trade with the natives; but we have seen that the whole territory is far too sparsely populated for it ever to assume large dimensions, especially as the trade in ivory and ostrich feathers has greatly diminished in recent years.

Hence, no prospects are at present apparent in any of the directions that have hitherto been tried.

But is South-West Africa therefore without value? I think not. Several authorities have recommended the production of wool in Great Nama-land; and from all that we know of the soil and vegetation, it is unlikely that this undertaking would prove a failure, as all the conditions are similar to those in Cape Colony, and in some respects even more favourable—as, *e.g.*, opuntias are almost unknown in Nama-land. A glance at the wool exports of Cape Colony since 1830 shows of what importance this may become in a comparatively short time. If a first success could thus be established, various other undertakings might likewise be made to pay, and with the progress of civilisation it is to be expected that trade, agriculture, and mining operations will also become profitable.

But the first thing will be to pacify the country, and not to expect too much from territories which have hitherto been almost entirely useless to the civilised world.

At the beginning of this paper I stated that my attention had been drawn by Mr. Theal's *History of South Africa* to the explorations of last century. It was generally believed that the Orange River was discovered by Gordon in 1777; that at some later period Paterson, and probably Le Vaillant, reached and crossed it, but that neither before nor after did any other traveller penetrate into the interior of Great Nama-land, until the mission station of Warmbath was founded in 1805. J. Alexander was regarded as the first scientific traveller who penetrated from the Orange River northwards. Mr. Theal's information, which he derived from the archives of Cape Colony, leaves no doubt that several other expeditions had in the last century reached and crossed the Orange River, the knowledge of which had been lost early in the present century. It is thus proved that the first discoverer of the Orange River was Coetsee,

who reached it in 1760; that in 1761-1762 a well-equipped exploring party under the command of Captain Hop, consisting of seventeen Europeans and sixty-eight natives, was sent by the Cape Government into the interior of Great Nama-land, and penetrated beyond the 26th degree of S. latitude; and that in 1791-1792 another expedition from the south reached as far as Damara-land. I have found, as already mentioned, that the British Museum Library contains the diary of the expedition of 1761-1762. This diary was published in Amsterdam in 1778, and is entirely unknown to our present-day geographers. It describes minutely the events of this journey, gives the distances and directions of the route, and has many valuable observations about the countries discovered. Thus I have been enabled to lay down the correct route of this expedition on our modern maps, which leads partly through still-unexplored districts of eastern Great Nama-land. As, however, the space of my paper is limited, I can deal but briefly with that part of the journey which refers to the countries north of the Orange River, omitting the information which the journal gives respecting the more southern territories.

The expedition reached the Orange River in September 1761, in about 18° 30′ E. longitude, and, after having crossed it, proceeded to a place where they found a hot spring, which can be no other than the site of the present mission-station Warmbath. The Orange is here described as about 1000 feet broad, with steep banks, and surrounded by high mountains close to the river, over which the travellers had to pass for several days, until they came to a periodic river which flows past Warmbath, its confluence with the Orange being south-east of that place. They called it the Lion River, and there is no doubt that it is the Hoom River of to-day coming from the Karas Mountains. Near Warmbath the mountains terminate, and a large and splendid grass-plain commences. They followed the course of the Hoom due north, finding plenty of water, until after a tedious journey of sixteen days the grass-plain ended, and they came to another mountainous district with many rocks and cliffs, in which we easily recognise the southern end of the Karas Mountains. From Warmbath to these mountains, Alexander's route, seventy-five years later, was almost identical; and he gives a similar description of the river, the plain, and the mountains. From thence, proceeding over the last low hills of these mountains, they reached, on October 28th, another periodic river, dry at that season of the year, called Draay, now Chamgagu, which flows into the Fish River near its confluence with the Orange. Continuing north, they crossed after two days another dry river-bed with steep banks, called the Kab, finding everywhere on the western side of the Karas Mountains splendid grass-plains, water, and pastures. Another day brought them to the end of the mountains, and after travelling through a steep and stony pass they reached a beautiful grass-plain extending northwards. Here they came to the beds of two dry rivers, tributaries of the Gamma, and reached the latter after a journey of two days, November 22d, 1761. The whole journey was very tedious, as they had fifteen wagons with them, and experienced great difficulties with their draught-oxen. The

country is here described as consisting of splendid plains covered with grass and bushes, isolated hills and mountains rising here and there. It seemed to be well peopled by Hottentots; and on the plains numerous wild animals—*e.g.*, rhinoceroses, buffaloes, giraffes, and various kinds of antelopes—were to be seen. The Gamma River is said to flow during the rainy season into the Fish river, and we can easily identify it with one of the largest eastern tributaries of the latter, the Chamob of to-day. Here the expedition encamped, and two of its members, Coetsee and Marais, explored the country still further north as far as the Fish River, and reached their furthest point, probably somewhat north of the 26th degree of S. latitude. The Fish River was almost dry, there being in some places merely pools of water. On both sides of it they found extensive plains and pastures. The Hottentots living there had much cattle, and our travellers found many wild animals, especially elephants. From here they returned to the camp; and the whole expedition commenced the return journey by the same route on December 7th, 1761, as it was found impossible to proceed further with the cattle and wagons during the dry season.

The inhabitants, who were numerous, were all Namacqua, divided into different independent tribes, of which the Comeinacqua, Tradiamacqua, Cabona, Korikambi, and Keinamacqua are the most important. The Keinamacqua, who were met with at the Fish River, are probably the "Red Nation" (Geikoum) of to-day, who live now in the district near Hoachanas. All these tribes, who had numerous fixed settlements, were engaged in cattle-rearing. They collected some particulars of other tribes, different from the Hottentots, and living further north. No other information was obtainable about the Damrocqua, of which Coetsee had heard in 1760; but the Keinamacqua reported that there were two nations living north-west of their country called, respectively, the Tamacqua and the Saumtamaap. The former are black and have incised their faces, whilst the latter live in the source-region of the Fish River. It is very probable that the Tamacqua and Coetsee's Damrocqua are identical and correspond to the Damara of to-day, and that the Saumtamaap are the Hill Damara of to-day, who are now called Ghoudamap by the Hottentots. There is another nation in the north-east, viz., the Birina, who bear a strong resemblance to the Tamacqua, and, like these, speak another language than that of the Namacqua. Probably they are another Bantu tribe. They barter with the Hottentots, receiving cattle for iron, copper, coral ornaments, etc.

The expedition further reported that the mountains which they discovered in Great Nama-land contain no copper but only mica. They are barren, and hence form a striking contrast to the grassy plains west and north.

Several of the tribes, of whom the expedition heard, seem to have been known to Paterson and Sparrman, but it is not clear where they obtained their information respecting them. The probability is, they were conversant with Hop's discoveries. Le Vaillant probably also knew of this expedition, and it is surprising that his doubtful journey to Great Nama-land in 1784-1785 should contain a number of names and

localities which coincide with those mentioned in the diary of the expedition of 1761. Le Vaillant's reports are by no means exact as regards distances, bearings, etc., and it is a matter of question whether he ever made the journey himself. However this may be, the diary of Hop's expedition is much more trustworthy and exact than the reports of all other contemporary travellers about the countries north of the Orange River.

*** *The passage on p.* 472, 11*th to* 13*th line, should run as follows :—*

"I have to add that, of the second of these expeditions I have hitherto been unable to obtain any other notice than the short account which Mr. Theal has given us in his book, and the reports which Dr. Büttner has published about Mr. Theal's researches (see BIBLIOGRAPHY, *Büttner*: 'Die ersten Reisenden,' etc.; 'Die erste Reise,' etc.)."

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MINERAL RESOURCES OF COLORADO.

By Wm. A. Bell, M.A., M.B. Cantab.

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The rectangular section of the earth's surface which forms the State of Colorado and straddles the back-bone of the North American Continent at its greatest elevation, possesses in many respects a vast amount of interest. It lies 1000 miles distant from the Pacific on the west, and 2000 from the Atlantic on the east, is about equidistant from Mexico on the south and the British possessions on the north, and covers an area of a little more than 100,000 square miles—say half the area of France. Its general topographical features are too well known to need special description. The eastern one-third consists of rolling plains, then to the westward, at an elevation of from 5000 to 6000 feet, the mountains rise from the plateau, range behind range, with a general trend north and south, and more or less cover the country as far as the shores of the Pacific. Amongst the mountains some thirty-nine peaks reach an elevation of over 14,000 feet above the sea-level; not one of them reaches 14,500.—a remarkable instance perhaps of uniform glacial erosion. Along the eastern foot of the mountains the chief towns of the State are rapidly growing. To them, through the natural gateways in the mountains, come the mineral productions—the ores of silver, gold, iron, copper and lead. From the southern and south-western part of the State are brought the coal and coke required to smelt them; and, all along the mountain-base, there are already raised, by means of irrigation, more than enough grain and vegetables to feed the entire population.

Agriculture is not, however, confined to the eastern mountain-base. The valleys amongst the mountains not higher than 7800 feet or lower than 7000 yield the hardier crops mostly without irrigation; and all over the State, particularly on the Pacific side of the continental water-shed, there are wide, warm, and very fertile valleys of lower elevation, which, by means of irrigation, have become very productive and are yielding the more tender fruits, including peaches and grapes, besides other produce. The broad valley of Grand River, above and below Grand Junction in the western part of the State, and the Montezuma valley to the south-west, are good examples. They are similar in general features to the Salt Lake Valley of Utah, and, if anything, more fertile.

Cultivation by means of irrigation was a new industry to the American settler twenty years ago. Everything connected with it had to be learned, and the active-brained Western colonists took the subject up with characteristic energy. The lawyers at once commenced to frame laws adapted to the hitherto new conditions, and they have been striving most diligently to make the irrigation laws of Colorado as just and as easy of application as possible; and a very hard task they are striving to accomplish. This code of laws has been growing—developing, in fact—year by year. Its main features are certainly worthy at least of mention.

The theory of original land tenure in the United States (Texas excepted) is this, namely, that the land, until it becomes owned by some

individual, is the property of the State, and that any man who desires to own land can acquire a certain limited quantity by paying certain moneys and doing certain acts. "First come, first served" is the maxim which has extended settlement so rapidly. Now, with respect to water, the State of Colorado considered itself empowered to make its own laws; and in its constitution it affirmed that the unappropriated water in the streams throughout the State and the bed of the streams were public property, and were open to "use and appropriation" by settlers just as the public lands were. Thus it separated the streams from the land. One man might take up land and another might take up water for use on a distant piece of land. But once a man acquired by "use and appropriation" a vested right to a specific amount of water, that amount of water became his property; and by paying certain fees and "proving up," as it is called, he had his water-right duly registered and accepted. Again, the maxim "First come, first served" obtains, and "priority of right" has been made the basis of the water laws of Colorado—and, we may say, of all the far Western States and Territories. Let us make this more clear. If *A* first takes from a certain stream a certain amount of water for the purpose of irrigating a certain piece of land, no matter where that land is situated with respect to the stream, it only being necessary that the water be diverted to the land and used to irrigate it, *A* then acquires a vested right for ever to take that amount of water from that stream provided the stream contains it, and *B*, who comes second as to his appropriation, or *L*, who comes twelfth, can only establish his right to water subject to the prior claims of those who are before him. This has been the principle adopted, instead of one looking to the equal subdivision of water amongst those who need it or its equal apportionment to neighbouring lands. An endless number of difficult points connected with water-rights have been, and are being, adjudicated in the courts of the State, and the legal difficulties involved in the equitable application of the "priority right" principle seem rather to increase than to diminish. And yet it is probably the best principle which an Anglo-Saxon nation can adopt. Meanwhile water companies have been formed all over the State, and millions of pounds sterling have been expended on irrigating canals and ditches. Indeed, the activity of the capitalist in rendering large areas of land arable, by putting them under ditch, has far outstripped the settler in his eagerness to acquire land under ditch. This may be accounted for, first, by the habitual caution exercised by the farmer before taking up any new process with which he is unfamiliar, and, secondly, by the fact that agricultural settlers are usually driven to seek a new locality on account of straitened circumstances, and lands under ditch have generally ceased to be public land, and have to be purchased at a profit to the owner. The water also, whether purchased outright or rented, costs the settler money. Thus, settlement on irrigable land in Colorado is for the most part beyond the reach of those who have not some means, and these latter are few as compared with the vast numbers of settlers who have been moving westward and extending the frontier line during the last twenty years, most of whom had very little, if any, capital.

Colorado is very justly becoming widely known and appreciated on account of the healthfulness of its climate. Persons suffering from asthma, and those who are more or less consumptive, usually derive great benefit from it. The surface varies so much topographically, that great variety of temperature exists there. Taking, however, the more favoured mean, which is to be found close to the mountains along the eastern base, at from 5600 to 6500 feet above the sea-level, it may be said that the heat of summer is never excessive, nor the cold of winter trying to the most delicate constitutions. The snow-fall is very light, the winters are open and sunny, and the average yearly precipitation is about eighteen inches. One is very seldom confined to the house from stress of weather, and yet it often freezes hard during the night, and, but for the dryness of the air and the strength of the sun, the winters might, taking the mean temperature, be considered too cold for invalids. This is, however, not at all the case. It is during the winter half-year that the tonic effects of this dry bracing air act most beneficially upon the system impoverished by consumption or other debilitating chronic ailments.

At such places as Colorado Springs and Maniton every comfort and many of the pleasures of life can be obtained, and banishment to the Rocky Mountains has become in reality a very enjoyable form of exile.

Has the climate been changed by cultivation and irrigation? The meteorological observations of many years do not yield any evidence of a marked change having taken place. A feeling of local dampness disposes people to think that the climate is changing, but in reality if the cultivation and irrigation of a limited area does to some small extent tend to increase the rainfall, this tendency is counterbalanced by the destruction of timber by fire and by the axe. From an elevation of 7000 feet to that of 11,000, the surface of the hill-country has been and would be mostly covered by timber, chiefly pine and spruce, but for the forest fires. It is fortunate for the country that a fast-growing species of the poplar, the Quaking Aspen, at once takes the place of the pines and spruces when destroyed, and shades the ground and retards the melting of the winter snows. Were it not for this aspen, Colorado, like some other similar countries, would soon become a parched and barren land. Again, irrigation on a large scale has been carried on in the Salt Lake Valley of Utah much longer than elsewhere in the United States, and yet here also there is no distinct evidence of an increased average rainfall. Nor has the periodical rise and fall of the Great Salt Lake, which has been carefully studied for thirty or forty years, been apparently affected by the farming operations. At present this great reservoir happens to be at its lowest stage.

From a scientific standpoint, however, the mineral resources of Colorado and the conditions under which they are found, are of far greater interest than its agricultural features. It is not only in the production of the precious metals that Colorado is pre-eminent. The country contains enormous coal-fields, vast deposits of iron ore and other base metals, and yields a good deal of petroleum from wells. We do not usually associate coal-fields with lofty mountains, gold and silver mines

and a great altitude. The two things seem incongruous. But yet, in Colorado they are co-existent. The Geological age of the Colorado coals has been a puzzle to men of science. It is now the general opinion that none of them belong to the true Carboniferous series, but that they are Tertiary or Cretaceous formations differing greatly in age, though not in any case reaching back to the Carboniferous era. They differ much in quality—in fact, all grades are represented.

Along the eastern mountain-base, north and south of Denver, the light Tertiary lignitic coals are found, and, although friable, high in water, and therefore not of great caloric power, these coals are mined extensively and sold as cheap fuel. They lie at an elevation of from 6000 to 7000 feet above the sea, and the seams which are being worked reach from ten to twelve feet in thickness. About 150 miles south of Denver, much older coal-measures (undoubtedly Cretaceous) are encountered. These measures yield strong bituminous coals. At El Moro and around Trinidad in the Raton Mountains, seams 11 ft. in thickness are worked, and the coal is not only a strong fuel, but produces an excellent coke, which is used extensively in the manufacture of iron and steel, and in silver-lead smelting. Other coals of the same series are semi-bituminous; they will not coke, but are better steam coals, and are preferred for reverberatory furnaces. Some 3000 to 4000 tons daily are produced from this locality and the neighbouring mines near Walsenburg. A large area of the Trinidad coal-field is covered with a thick overflow of basalt, and many trap-dykes cut through the coal-measures. Close to the dykes the coal in places has been converted into a porous natural coke, hardly distinguishable from the coke of commerce.

Up amongst the mountains still purer coals are found. Crested Butte, situated in about the centre of the western half of the State, is a great coal district. Here coking coal of a very fine quality and of the same geological age is mined, and the coke made from it is excellent. The mines here are some 9000 feet above the sea-level, and are surrounded by an amphitheatre of lofty mountains. As these pure and very bituminous coal-measures approach the actual mountains themselves, which are mostly composed of igneous rocks, they rapidly change in character; they become less bituminous, then semi-anthracitic, until within a certain limited distance from the trachytic rocks, perfect anthracite, containing from 89 to 92 per cent. of fixed carbon, is encountered. Nowhere is this change better exemplified than along the valley for a few miles north of Crested Butte. On the left side the coal-measures are exposed. At Crested Butte they are strongly bituminous, and the little town is all aglow with coke-ovens every night. Two miles above, these same coal-seams are found to be worthless, having undergone partial conversion into anthracite, but being, so to speak, neither one thing nor the other. Still farther up the valley, some four miles from the town, and at an elevation of about 1200 feet above it, the coal is completely converted into anthracite, and extensively mined, the anthracite being of excellent quality. From this source all Colorado and the whole country westward to San Francisco are supplied with this highly-prized fuel. The anthracitic area at this place is very limited. The

coal-seams run through a level isolated plateau on the east side of the valley, some 200 feet below the top, and some 800 feet above the base of this plateau, which occupies little more than a square mile of surface. Around the plateau, which represents the original formations *in statu quo*, the coal-measures are carried away by erosion or crushed to pieces by the mountain upheavals. Other areas, adjacent to the igneous rocks, which have escaped erosion, also contain anthracite, in different parts of this extensive coal-field. These, however, are not yet available, because they have not yet been tapped by a railway. The railway supplying these Crested Butte coal-mines carries out an average of about 1000 tons of coal and coke daily. There are many silver-mines in close proximity to these coal-mines, and auriferous gravels are worked along many of the streams.

Some fifty miles north-west of Crested Butte, another portion of this coal-field is actively mined, viz., between Glenwood Springs and Aspen, where coke is also made. Aspen is a great silver-mining centre, where millions of dollars of silver and gold are produced annually.

Comparative Table of Analysis of Colorado Coals.

		Sp. grs.	Fixed Carbon.	Volatile Matter.	Water.	Gas.	Sulphur.
Coking Coal.	El Moro,	1·315	55·40	23·50	0·90	20·20	0·906
	Crested Butte,	1·344	72·60	23·20	1·10	3·10	
	Durango (Upper measures),	...	54·58	29·13	1·80	14·49	
	Porter Coal, near Durango (Lower measures),	...	66·77	30·11	0·64	2·48	0·52
	Pennsylvania (for comparison),	1·285	61·45	31·45	1·30	5·80	1·04
Semi-Bituminous.	Cañon,	1·29	56·00	35·00	5·00	4·00	
	Walsenburg,	...	48·67	40·08	2·97	8·28	
	Ohio Creek, Gunnison Country,	1·273	54·80	40·40	1·30	3·50	
Anthracite.	Crested Butte, 5 ft. seam,	...	89·89	6·29	...	3·82	
	Do. do. 3 ft. 6 in. seam,	...	90·65	5·17	...	4·18	
	Northern Colorado Lignites (average),	1·35	50·00	33·00	14·00	4·00	

There is one other coal-mining centre worthy of mention. This is at Durango, far away in the south-west corner of the State. Here there are two series of coal-measures. The more recent, geologically, is of great thickness. In about 120 feet, measured at right angles to the strata, there are ninety feet of coal, the intervening layers being shales and sand-stones. One of these individual seams is fourteen feet in thickness. This coal cokes well, and stands the weather well, but is too high in ash to rank with the best coals of the State. The older coal-measures are numerous, but they seldom exceed four feet in thickness. One of these seams is worked. The coal is a coking coal of very high grade. It furnishes coke for the smelting-works at Durango, and fuel for the mines of Red Mountain, Silverton, Telluride, and Rico. All these flourishing and productive mining-towns, which together furnish

from three to four million dollars a year, in silver and gold, lie within a radius of fifty miles of the coal-mines. There is a great future for this south-western corner of the State. It has wide-spread mineral wealth, vast coal deposits of high quality, and a very fertile soil, with broad valleys and abundance of water for irrigation; also a splendid climate. Hitherto it has been so far away that it is only now attracting attention. It is now well opened up by railways, which are doing a good business.

In referring to the gold and silver mines of Colorado, I will confine my remarks chiefly to pointing out the different conditions under which the precious metals occur in various places throughout the State. These metals occur for the most part under conditions which may be classed under three tolerably distinct heads:—(1*st*) In true fissure veins, where the matrix filling up the cleft or fissure is mostly quartz, but may be represented by a great variety of non-metallic substances in whole or in part, such as Sulphate of Baryta (heavy spar), Fluoride of Calcium (fluor spar), Lime Spar, or crystallised carbonate of lime. The mineral is deposited unequally through the matrix either from solutions or perhaps in a gaseous condition accompanied with super-heated steam. The *true fissure*, however, which may cleave its way through any number of different strata at any angle, is here the *governing feature*. (2*nd*) These metals are found deposited between previously existing strata, generally sedimentary, sometimes sedimentary on one side and igneous on the other. Such deposits are known in Colorado as "contact veins." There are generally evidences in these cases of movement or slipping having taken place, thus allowing water to percolate between the strata where the contact veins occur. One stratum is generally magnesian limestone, which is easily attacked by water more or less impregnated with various salts, amongst them, salts of the precious metals, especially associated with salts of lead, copper, and iron. The other stratum on the other side of the "contact vein" may be anything—very commonly it is porphyry. (3*d*) We find the precious metals and their salts, deposited during the last stages of solfataric action, in places where thermal springs, mud-volcanoes and the like have formerly existed, often associated with dykes of porphyritic rock. Subsequently the tubes or channels of the springs are filled with saline and other deposits containing the metals in combination, which also often impregnate the contiguous country rock, producing large irregular masses commonly spoken of as *ore bodies*.

Now, the first discoveries of precious metals made in Colorado were those of free gold in the beds of certain streams in the mountains immediately west of Denver, and in gravels at the heads of the Arkansas River, in the neighbourhood of what is now Leadville. Then true fissure veins were discovered containing gold and silver, but mostly silver, and, the true fissure vein being a well-recognised feature, the mining laws of the United States were framed to meet the requirements of alluvial gold deposits and true fissure veins. The discoverer of a vein was allowed to claim 1500 ft. in length along the vein, and a surface area of 300 ft. in width, and he might follow the vein in depth to any distance beyond his side-lines—in fact, wherever it might dip within the 1500 ft. of length.

When, years afterwards, the now famous Leadville mines were discovered and opened up, most of them bore no similarity to *true fissure veins*, but a great similarity to a coal-seam. They were mostly "contact veins" or deposits of metalliferous material along the line of contact of two dissimilar strata, and the then-existing mining laws did not strictly apply. An appalling amount of litigation was the result. To allow a discoverer to follow a contact vein which occupied the interstices between two *horizontal* strata, indefinitely beyond his side-lines, was giving him an enormous latitude—far more than was intended by the fissure-vein laws, or contemplated by their framers. Both judges and juries were at their wits' end, and the jurors had to be invoked to frame new laws and modify old ones. Gradually matters settled down, partly as the result of compromises amongst the contestants, and partly as the result of the decisions of the Courts. After Leadville came the Aspen discoveries, and although the metalliferous material was here again mostly found in "contact veins," large masses or bodies of ore were unearthed which had neither distinct walls nor definable direction nor apex, nor any apparent fixed boundaries, so that the Courts were again crowded with litigants. The general tendency of all this recent litigation has, however, been to restrict the limits of each mining claim not only to its end-lines, but also to its side-lines produced vertically downwards. In other words, to restrict a claim, unless it be undoubtedly a true fissure-vein, to 1500 ft. by 300 ft. in vertical depth as well as at the surface. To pursue this subject further in a short paper like this is impracticable. My object is chiefly to point out how many difficulties of an unlooked-for and unavoidable character have attended the pursuit of gold and silver mining in Colorado, and to show also how old theories and experiences have to be modified by the results of time and a wider knowledge.

Throughout Colorado electricity is much used not only for lighting, but for motive-power. Amongst the mines advantage has been taken of the water-power furnished by mountain-torrents, and by means of a system of hydraulics very similar to that used in hydraulic gold mining, small columns of water with from 300 to 600 feet of head or pressure are made to turn wheels of peculiar construction which, in turn, work the dynamos. In this way electricity is cheaply generated, and is sold to the mining companies at about 2s. daily per horse-power for working hoisters, drills, tram-roads, in some instances coal-cutting machines, as well as concentrating mills and other appliances.

Great success has accompanied the effort to bore for artesian water all over the State. In and around Denver there are hundreds of artesian wells in use. The domestic water-supply of the town of Alamosa is furnished from artesian wells. Throughout the western half of the Great San Luis valley nearly every farm has its flowing well, artesian water being generally reached in this locality within 100 feet of the surface. In fact it is the exception not to strike artesian water in any valley where it is bored for; and in almost every district boring machinery can be obtained.

THE BRITISH ASSOCIATION, 1891.

Proceedings of the Geographical Section.

THE sixty-first Annual Meeting of the British Association for the Advancement of Science took place at Cardiff, commencing on Wednesday, 19th August. Dr. William Huggins was elected President.

The number of tickets issued was 1488, realising a sum of £1664. Grants of money for scientific purposes were made to the amount of £1013, 15s. 6d. Out of this sum the Geographical Section obtained £75 for the purpose of instituting a series of systematic observations on the climatological and meteorological conditions of Tropical Africa. Other grants, more or less subservient to Geographical investigation, were made as follows:—Meteorological observations on Ben Nevis, £50; seismological phenomena of Japan, £10; photographs of meteorological phenomena, £15; photographs of geological interest, £20; underground waters, £10; fauna of Sandwich Islands (renewed), £100; zoology and botany of the West India Islands, £100; prehistoric remains in Mashona-land, £50; North-western tribes of Canada, £100; and habits, customs, etc., of natives of India, £10.

The Geographical Section had this year as President a scientific geographer of high repute. Mr. Ravenstein's presidential address, which we publish as an Appendix, was a masterly survey of the progress of cartography; and, incidentally, it contained some notable remarks on the field of Geography. The office-bearers of Section E (Geography) were as follows:—

President.—E. G. Ravenstein, F.R.G.S., F.S.S., F.R.S.G.S.

Vice-Presidents.—Colonel Sir Francis de Winton, R.A., K.C.M.G., C.B.; H. Seebohm, HON. SEC. R.G.S., F.L.S., F.Z.S.

Secretaries.—John Coles, F.R.A.S., F.R.G.S.; J. Scott Keltie, F.R.G.S. (*Recorder*); H. J. Mackinder, M.A., F.R.G.S; A. Silva White, F.R.S.E., SEC.R.SCOT.G.S.; Dr. Yeats.

Committee.—Right Hon. Lord Aberdare, G.C.B., F.R.S.; Professor Copeland; Professor Boyd Dawkins, F.R.S.; Dr. R. W. Felkin, F.R.S.E.; Dr. Hugh R. Mill, F.R.S.E.; E. Delmar Morgan; Principal Grant Ogilvie, F.R.S.E.; Colonel T. H. Holdich, R.E.; Dr. J. S. Phené; Trelawney Saunders; G. E. T. Smithson, SEC.T.G.S.; Eli Sowerbutts, SEC.M.G.S.; G. J. Symons, F.R.S.; Colonel H. Tanner; J. Thomson; C. T. Whitmell; Lewis Williams, J.P.

The following is a list of the Papers read in Section E (Geography):—

Thursday, 20th August.

1. President's Address.
2. *John Coles*, F.R.G.S.—The Art of Observing.
3. *J. Scott Keltie*, F.R.G.S.—Geographical Education.
4. *Miller Christy.*—Trees and Plains.
5. *Dr. Hugh R. Mill*, F.R.S.E.—The Homology of Continents.
6. *A. Silva White*, F.R.S.E.—On the Comparative Value of African Lands.

Friday, 21*st August*.

1. A discussion on the subject of Acclimatisation, introduced by Dr. Robert W. Felkin, F.R.S.E.
2. *Dr. Phené.*—Changes in Coast-Lines.
3. *J. E. B. Meakin.*—Morocco as a Field for Geographers.
4. *Miss E. M. Clerke.*—The Aborigines of Western Australia.
5. *Colonel Holdich.*—The Application of Indian Survey Methods to Africa.
6. *Colonel Tanner.*—Bar-Subtense Survey.
7. *Gwyn Morris.*—Commercial Geography.

Saturday, 22*d August*.

1. Lecture by *Mr. Ravenstein* on the Series of Maps illustrating his Presidential Address.
2. *H. T. Crook.*—The Ordnance Survey.
3. The *Librarian of the Public Library of Cardiff* contributed some remarks on a collection of local maps.

Monday, 24*th August*.

1. *E. Delmar Morgan.*—Antarctic Exploration.
2. *J. Thomson.*—Photography applied to Exploration.
3. *Harry D. Buckle.*—Journeys in the Lake Ngami Region.
4. *Mrs. French-Sheldon.*—A Visit to Kilima-njaro and Lake Chala.
5. *Dr. Schlichter.*—South-West Africa.

Tuesday, 25*th August*.

1. *Lord Lamington.*—The Siam Border-land.
2. *Dr. Bell.*—Mineral Resources of Colorado.
3. *A. J. Montefiore.*—The Physical and Industrial Geography of Florida.
4. *Mr. Dobson.*—The Volta River.
5. *Mrs. Bishop* (*Miss Isabella L. Bird*).—The Bakhtiari Country and the Karun River.
6. *Colonel Tanner.*—Physical Aspects of the Himalaya and Notes on the Inhabitants.
7. The Proposed formation of a Topographical Society at Cardiff.

The purely technical papers in the above list were all contributed by well-known authorities, and were of high value, if somewhat above the heads of the audience. Mr. John Coles, the Royal Geographical Society's Instructor, submitted an admirable paper on *The Art of Observing*. The different methods suitable to explorers of fixing positions by astronomical observations were exhibited and explained, and the manner in which they may be taken, so as to eliminate errors, was pointed out. The latter part of the paper dealt with surveying, fixing heights by barometer, route-surveying in a jungle or forest; and it concluded with some remarks on Mercator's projection in cases where it was required to lay down bearings, etc., or plot a route. The author also called attention to the fact that such instruments as the plane table and prismatic compass might be used with advantage in schools, and that such practical teaching in the field could not fail to give pupils a more intimate knowledge of the principle on which maps are constructed and surveys carried out than they could gain in any other way.

Colonel Tanner, one of the most distinguished officers of the Indian

Survey, read two papers. That on *Bar-Subtense Survey*, a system carried out by himself during the past four years in the Himalaya, and recommended for adoption in the case of isolated surveys of unexplored countries, was too technical a paper for his audience. His account of the *Physical Aspects and Inhabitants of the Himalaya* was, however, of more general interest. We hope to publish this paper in a subsequent issue.

Colonel Holdich, another well-known authority, dealt with *The Application of Indian Geographical Survey Methods to Africa.* An outline of the methods proposed may be summarised as (1) the adoption of a rapid system of triangulation along the most important lines for first survey; and (2) the extension of a graphic system of mapping from these lines by means chiefly of native labour. The most important lines for a primary survey in Africa are, of course, those of international boundaries, few of which have been determined by permanent natural features. This scheme, based on experience in Asia, was propounded by Colonel Holdich in a manner that was theoretically convincing; but any attempt to put it into practice would in all probability be a failure, owing to physical and political obstacles, such as climatic risks, the uncertain character of native aid, and international rivalries in Africa.

Another paper on the subject of new methods in surveying was that contributed by Mr. John Thomson, who has had considerable practical experience as a traveller and photographer. His recommendations in regard to *Photography Applied to Exploration* received the support of Colonel Tanner, among others, and promise to be of the utmost value in the detailed mapping of surface-features.

Dr. Hugh R. Mill's suggestive paper on *The Homology of Continents* greatly interested his audience. He explained the homology, or "family likeness" of the continents, not only as to form or structure, but also as to the part they play in modifying the circulation of oceans and air, and to the distribution of climate. The typical form of continent was described in detail by means of a model; and the deviations from the typical form in each continent were explained by means of orographical and climatological maps. Another excellent essay in Physical Geography was that contributed by Mr. Miller Christy, with the object of eliciting an answer to the question: *Why are the Prairies Treeless?* The main cause he asserted to be the prevalence of vast prairie-fires, which for generations past have swept over the prairies almost year by year, destroying the trees and preventing the growth of others. Mr. Miller Christy's arguments in this respect are set forth at some length in the abstract of his paper, which we shall publish next month.

Dr. Phené contributed a lengthy paper on *Changes in Coast-Lines.*

The subject of *Antarctic Exploration* was introduced by Mr. Delmar Morgan, who gave a succinct account of the recent movement in Australia for the exploration of the Antarctic Regions. The Antarctic Committee of the British Association was not reappointed this year, its objects having been superseded by the more energetic and practical steps taken in the Australian Colonies in conjunction with Baron Oscar Dickson and Baron Nordenskiöld. On the return of this expedition, which, owing to its limited funds, can only hope to fulfil the duties of a pioneer, there is

room for hope that the British Association, with the support of the leading scientific societies, may again petition the British Government to send out an expedition capable of following up the discoveries of Sir James Clark Ross.

Dr. Robert W. Felkin introduced the subject of *Acclimatisation* in a paper which we hope to publish in a subsequent number of the Magazine. His address did not elicit a fruitful discussion, because, as so constantly happens on such occasions as this, the speakers did not confine their remarks to the subject of the paper, but wandered off into inconsequent and personal narration.

There were several papers dealing with original exploration, and of these Mrs. Bishop's account of the *Bakhtiari Country* was by far the most important. Mrs. Bishop spoke for the greater part of an hour, merely from notes, but without the slightest hesitation. Her subject-matter and its manner of treatment were, in her hands, a model of excellence. We avoid further reference to it because Mrs. Bishop is to read a similar paper to our Society in January next. Mrs. French-Sheldon's account of her *Visit to Kilima-njaro* interested a large audience; its only claim to geographical importance was, however, the few remarks offered on Lake Chala, which Mrs. French-Sheldon was the first European to actually navigate. Lord Lamington gave a full and instructive account of his recent journey to *The Siam Border-land*, an account which our Society hopes to hear from his own lips in the course of the ensuing winter session. Equally interesting was Mr. Harry D. Buckle's paper on his *Journeys in the Lake Ngami Region*. Mr. Buckle attests to the continued desiccation of the Lake; and, being the last European traveller in that region, his testimony is valuable. He was present at the time of Moremi's death.

We need not allude at any length to Dr. Henry Schlichter's admirable and painstaking *résumé* of the *Geography of South-West Africa*, because the first part of it was published last month in our magazine, and the concluding portion is given this month. The only other papers on Africa, besides the one which I myself contributed, were Mr. Dobson's useful description of the economic and geographical conditions in the neighbourhood of *The Volta River*, and a somewhat critical paper by Mr. Bridgett Meakin on *Morocco as a Field for Geographers*. An elaborate and comprehensive paper on *The Physical and Industrial Geography of Florida* was contributed by Mr. Arthur Montefiore; and a most useful paper, which precedes this notice, was contributed by Dr. Bell on *Colorado*. Miss E. M. Clerke gave an interesting account of the monastic settlement of New Nursia, 70 miles from Perth, Western Australia, and incidentally showed how the *Aborigines of Western Australia* were capable of being raised to a higher level of civilisation.

The subject of *Geographical Education* was introduced by its able exponent, Mr. Scott Keltie, in a paper describing the progress made in this country; but it failed to elicit a discussion. In spite of this fact, Dr. Yeats subsequently introduced a proposal to establish a *Topographical Society* at Cardiff. The proposal, however, met with very slight outside support, in consequence, it was alleged, of the subject having come up

without sufficient warning. But that Geography was not altogether neglected at Cardiff might, in the absence of other evidence, be inferred from the grasp of the subject evinced by a local teacher, Mr. Gwyn Morris, in his paper on *Commercial Geography*.

Mr. Crook again introduced the much-vexed question of *The Revision and Improvement of the Large-scale Maps of the Ordnance Survey*. The reforms which he advocates have already been set before our readers. His paper called forth considerable discussion, and resulted in the following *Recommendations* being drawn up by the Committee of Section E:—

1*st*. That the publication of the one-inch and six-inch Ordnance Survey Maps is, in the interests of science, urgently required at the earliest possible date, no less than in the interests of industry, manufacture, and technical education.

2*nd*. That steps be taken and provision made for keeping the Ordnance Maps up to date.

3*rd*. That the Maps as at present published are capable of certain improvements, as, for instance, the addition of coloured contours, the shading of the hills on the six-inch Maps, etc.

4*th*. That the interests of the Survey require that its Director should hold a permanent appointment.

5*th*. That the Maps should be made more accessible to the public and should be sold at a lower price, as is the case in nearly all other official publications, such as Admiralty Charts, Blue-books, etc.

The above *Recommendations* were submitted to the Council of the Association, who had previously shown a desire to take action in the matter, but they are understood to have received only partial support.

The next meeting of the Association is to take place at Edinburgh, commencing on 3rd August 1892.

ARTHUR SILVA WHITE.

THE FIELD OF GEOGRAPHY.

(*Being the Presidential Address to the Geographical Section of the British Association, Cardiff*, 1891.)

By E. G. Ravenstein, F.R.S.G.S., F.R.G.S.

It behoves every man from time to time to survey the field of his labours, and to render an account unto himself of the work he has accomplished, and of the tasks which still await him, in order that he may perceive whether the means employed hitherto are commensurate with the magnitude of his undertaking, and likely to lead up to the desired results.

Such a survey of the *Field of Geography* I propose to make the subject of my address to-day. You are aware that this field is a large one, that its boundaries are defined no more precisely than are the boundaries of other fields of human research, and that the fellow-labourers who join us in its cultivation are not always agreed as to the tasks that are peculiarly their own, or as to the methods in accordance with which their work should be carried on. By some of our neighbours we have not infrequently been accused of encroachments, and of overstepping

our legitimate boundaries in order to invade adjoining fields already in the occupation of others, who are not only willing to cultivate them, but even claim to be better qualified than we are. There is undoubtedly some truth in this reproach, for, although there have been, and perhaps still are, geographers who would limit their task to a mere description of the Earth's surface, there are others, to judge them by their performances, to whom earth and universe, geography and cosmography, are synonymous terms.

If, as a lexicographer, I were merely called upon to define the literal meaning of the word "geography," I should content myself by saying that it meant a "description of the Earth." This, however, is merely the translation of a name given to our department of knowledge in an age when all natural science was descriptive, and scientific inquirers were still content to collect facts, without attempting to reduce them to a system. The ancient name, however, has been retained, notwithstanding that our conception of the duties of the geographer has undergone a notable change. The German word "Erdkunde," although too comprehensive, would perhaps be preferable, but could be rendered only by the word "geology," a term already appropriated to quite a distinct department of science, which has much in common with geography, and may even be described as its offspring, but is most certainly not identical with it.

Very varied have been the views as to what geography should embrace. Whilst Ptolemy confined the duties of the geographer to the production of a correct map of the Earth's surface, others fell into the opposite extreme, and were unable to resist the temptation of embellishing their "systems of geography" with historical excursions, and with information of the most varied kind, only remotely, if at all, connected with their subject. But whilst the geographer should guard, on the one hand, against being drawn away from his legitimate tasks, he should not, on the other, allow himself to be intimidated by those who, on the pretence of creating a geographical "science," would frighten him away from fields of research which his training enables him to cultivate to greater advantage than can be done by representatives of other departments of knowledge.

But whatever changes may have taken place respecting the aims of the geographer, it is very generally acknowledged that the portraiture of the Earth's surface in the shape of a map lies within his proper and immediate domain. And there can be no doubt that a map possesses unique facilities for recording the fundamental facts of geographical knowledge, and that with a clearness and perspicuity not attainable by any other method. You will not, therefore, think it strange if I deal at considerable length with the development of cartography, more especially as my own labours have in a large measure been devoted to that department of geographical work. An inspection of the interesting collection of maps of all ages which I am able to place before you will serve to illustrate what I am about to say on this subject.

You may take it for granted that maps have existed from the very earliest times. We can hardly conceive of Joshua dividing the Promised Land among the twelve tribes, and minutely describing their respective boundaries, without the assistance of a map. The surveyors and land-measurers of the civilised states of antiquity undoubtedly produced cadastral and engineering plans, which answered every practical requirement, notwithstanding that their instruments were of the simplest. This is proved by a plan of Rome, the only document of the kind which has survived, at least in fragments, to the present time. It is engraved on slabs of marble on a scale of 1 : 300, and was originally fixed against a wall of the Roman Town Hall, so that it might be conveniently consulted by the citizens.

Of the existence of earlier maps of the World or even of provinces, we possess

only a fragmentary knowledge. Anaximander of Miletus (634-546 B.C.) is credited among the Greeks with having produced the first map. His countryman, Hecatæus the Elder, who had seen many lands, and of whom Herodotus borrowed the terse saying that Egypt was the gift of the Nile, about 500 years before Christ, exhibited to his fellow-citizens a brazen tablet upon which was engraved "a map of the entire circuit of the world, with all its seas and rivers," and pointed out to them the vast extent of the empire of Darius, with whom they were about to engage in hostilities. But his warning proved in vain, and their disregard of the teachings of geography had, as usual, to be dearly paid for.

That maps grew popular at an early age is proved by Aristophanes, who, in his comedy of *The Clouds*, 423 B.C., has a map of the World brought upon the stage by a disciple of the Sophists, who points out upon it the position of Athens and of other places familiar to the audience.

A real advance in cartography was made when Dicæarchus of Messana (390-290 B.C.) introduced the parallel of Rhodes, as a separator between the northern and the southern habitable worlds. This "diaphragm" was intersected at right angles by parallel lines representing meridians. This system of graduating a map was accepted by Eratosthenes (276-196 B.C.), and appears to have kept its hold upon the more scientific cartographers up to the time of Marinus of Tyre, the immediate predecessor of Ptolemy. Whether the map of the Roman Empire, which Agrippa, the son-in-law of Augustus, caused to be placed under a portico, and which was based upon itinerary surveys began forty-four years before Christ, was furnished with parallels and meridians we do not know. It probably resembled in appearance some of our mediæval maps, like that of Richard of Haldingham, still preserved in the cathedral of Hereford. Widely different from it were the road-maps or *Itineraria picta* of the Romans, of which "Peutinger's Table" is a well-known example of a late date.

Such, then, were the maps which existed when Ptolemy of Alexandria appeared upon the field, and introduced reforms into the methods of representing the Earth's surface, which fully entitled him to the foremost place among ancient cartographers, and which inspired his successors when the study of science revived in the fifteenth century.

Ptolemy, like all great reformers, stood upon the shoulders of the men who had preceded him, for before a map like his could be produced much preliminary work had to be accomplished. Parmenides of Elea (460 B.C.) had demonstrated that our Earth was a globe, and Eratosthenes (276-196 B.C.) had approximately determined its size. Hipparchus (190-120), the greatest astronomer of antiquity, the discoverer of the precession of the equinoxes, and the author of a catalogue of stars, had transferred to our Earth the auxiliary lines drawn by him across the heavens. He had taught cartographers to lay down places according to their latitude and longitude, and how to project a sphere upon a plane. It is to him we are indebted for the stereographic and orthographic projections of the sphere. Ptolemy himself invented the tangential conical projection.

The gnomon or sun-dial, an instrument known to the Chinese 600 years before Christ, had long been used for the determination of latitudes, and the results were relatively correct, although uniformally subject to an error of sixteen minutes, which was due to the observers taking the altitude of the upper limb of the sun, when measuring the shadow case by their dial, instead of that of the sun's centre.

It was known, likewise, that differences of longitude could be determined by the simultaneous observation of eclipses of the sun or moon, or of occultations of stars, and Hipparchus actually calculated ephemerides for six years in advance to facilitate computations. Ptolemy himself suggested the use of lunar distances.

But so imperfect were the astrolabes and other instruments used by the ancient astronomers, and especially their time-keepers, that precise results were quite out of the question.

Ptolemy, in fact, contented himself with accepting eight latitudes determined by actual observation, of which four were in Egypt, whilst of the three longitudes known to him he only utilised one in the construction of his map. Unfortunately, the one selected proved the least accurate, being erroneous to the extent of 32 per cent., whilst the error of the two which he rejected did not exceed 13 per cent.[1] This want of judgment—pardonable, no doubt, under the circumstances—vitiated Ptolemy's delineation of the Mediterranean to a most deplorable extent, far more so than did his assumption that a degree only measured five hundred stades, when in reality it measures six hundred. For whilst the breadth of his Mediterranean, being dependent upon the relatively correct latitudes of Alexandria, Rhodes, Rome, and Massilia fairly approximates to the truth, its length is exaggerated to the extent of nearly 50 per cent., measuring 62° instead of 41° 40′. This capital error of Ptolemy is due therefore to the unfortunate acceptance of an incorrect longitude, quite as much as to an exaggeration of itinerary distances. It is probable that Ptolemy would have presented us with a fairer likeness of our great inland sea had he rejected observed latitudes and longitudes altogether, and trusted exclusively to his itineraries and to such bearings as the mariners of the period could have supplied him with.

No copy of Ptolemy's original set of maps has reached us, for the maps drawn by Agathodæmon in the fifth century are, under the most favourable circumstances, merely reductions of Ptolemy's originals, or they are compiled from Ptolemy's *Geography*, which, apart from a few explanatory chapters, consists almost wholly of lists of places, with their latitudes and longitudes.

An examination of Ptolemy's maps shows very clearly that they were almost wholly compiled from itineraries, the greater number of which their author borrowed from his predecessor Marinus. It shows, too, that Ptolemy's critical acumen as a compiler cannot be rated very high, and that he failed to utilise much information of a geographical nature which was available in his day. His great merit consisted in having taught cartographers to construct their maps according to a scientific method. This lesson, however, they were slow to learn, and centuries elapsed before they once more advanced along the only correct path which Ptolemy had been the first to tread.

During the "Dark Ages" which followed the dismemberment of the Roman Empire there was no lack of maps, but they were utterly worthless from a scientific point of view. The achievements of the ancients were ignored, and the principal aim of the map-makers of the period appears to have been to reconcile their handiwork with the orthodox interpretation of the Holy Scriptures. Hence those numerous "wheel maps," upon which Jerusalem is made to represent the hub, whilst the western half of the disk is assigned to Europe and Africa, and the eastern to Asia.

As it is not my intention to introduce you to the archæological curiosities of an uncritical age, but to give you some idea of the progress of cartography, I at once pass on to the Arabs.

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[1] The three longitudes are the following :—

	Result of ancient observations.	Adopted by Ptolemy.	Actual difference of longitude.
Arbela	45° E. of Carthage	45°	34°
Babylon	12° 30′ E. of Alexandria	18° 30′	14° 18′
Rome	23° E. of Alexandria	23° 50′	17° 24′

The Arabs were great as travellers, greater still as astronomers, but contemptible as cartographers. Their astronomers, fully possessed of the knowledge of Ptolemy, discovered the error of the gnomon, they improved the instruments which they had inherited from the ancients, and carefully fixed the latitudes of quite a number of places. Zarkala, the Director of the Observatory of Toledo, even attempted to determine the difference of longitude between that place and Bagdad; and if his result differed to the extent of three degrees from the truth, it nevertheless proved a great advance upon Ptolemy, whose map exhibits an error amounting to eighteen degrees. Had there existed a scientific cartographer among the Arabs, he would have been able, with the aid of these observations and of the estimates of distances made by careful observers like Abul Hasan, to effect most material corrections in the map of the known World. If Edrisi's map (1154) is better than that of others of his Arab contemporaries, this is simply due to his residence at Palermo, where he was able to avail himself of the knowledge of the Italians.

Quite a new epoch in the history of cartography begins with the introduction of the magnetic needle into Europe. Hitherto the seaman had governed his course by the observation of the heavens; thenceforth an instrument was placed in his hands which made him independent of the state of the sky. The property of the magnet or "loadstone" to point to the north first became known in the eleventh century, and in the time of Alexander Neckam (1185) it was already poised upon a pivot. It was, however, only after Flavio Gioja of Amalfi (1302) had attached to it a compass-card, exhibiting the direction of the winds, that it became of such immediate importance to the mariner. It is only natural that the Italians, who were the foremost seamen of that age, should have been the first to avail themselves of this new help to navigation. At quite an early date, as early probably as the twelfth century, they made use of it for their maritime surveys, and in course of time they produced a series of charts upon which the coasts frequented by them, from the recesses of the Black Sea to the mouth of the Rhine, are delineated for the first time with surprising fidelity to nature. The appearance of these so-called compass-charts, with gaily-coloured roses of the winds and a bewildering number of rhumb-lines, is quite unmistakable. A little consideration will show you that if the variation of the compass had been taken into account in the construction of these charts, they would actually have developed into a picture of the World on Mercator's projection. But to deny them all scientific value because they do not fulfil this condition, is going too far. As correct delineations of the contours of the land they were a great advance upon Ptolemy's maps, and it redounds little to the credit of the "learned" geographers of a later time that they rejected the information so laboriously collected and skilfully combined by the chart-makers, and returned to the deformities of Ptolemy. The adjustment of these charts to positions ascertained by astronomical observations could have been easily effected. An inspection of my diagrams will prove this to you. The delineation of Italy on the so-called Catalan map (1375), is surprisingly correct; whilst Gastaldo (1545), whose map of Italy is nearly two hundred years younger, has not yet been able to emancipate himself from the overpowering authority of Ptolemy. And in this he did not sin alone, for Italian and other cartographers of a much later time still clung pertinaciously to the same error.

There were others, however, who recognised the value of these charts, and embodied them in maps of the entire World. Among such were Marino Sanuto (1320) and Fra Mauro (1453), both of whom made their maps the repository of much information gathered from the Arabs or from their own countrymen who had seen foreign parts. Fra Mauro, more especially, has transmitted to us a picture

of Abyssinia marvellously correct in its details, though grossly exaggerated in its dimensions.

Another step in the right direction was taken when the cartographers and pilots of Portugal and Spain returned to the crude projection of Dicæarchus, Eratosthenes, and Marinus, which enabled them to lay down places according to latitude and longitude upon their "plane charts."

Germany, debarred from taking a share in the great maritime discoveries of the age, indirectly contributed to their success by improvements in mathematical geography and the introduction of superior instruments. The navigators of the early Middle Ages still made use of an astrolabe when they desired to determine a latitude, but this instrument, which in the hands of an expert observer furnished excellent results on land, was of little use to a pilot stationed on the unsteady deck of a vessel. Regiomontanus consequently conferred an immense service upon the mariners of his time when, in 1471, he adapted to their use an instrument already known to the ordinary surveyors. It was this cross-staff which Martin Behaim introduced into the Portuguese navy, and which quickly made its way among the navigators of all countries. Most observations at sea were made with this simple instrument, variously modified in the course of ages, until it was superseded by Hadley's sextant. In the hands of the more skilful navigators of the seventeenth century, such as Baffin, James, and Tasman, the results obtained with the cross-staff were correct within two or three minutes.

Far greater difficulties were experienced in the observations of longitudes. Lunar eclipses were most generally made use of, but neither the ephemerides of Regiomontanus, for the years 1474 to 1506, which Columbus carried with him on his voyages, nor those of Peter Apianus, for 1521-70, were sufficiently accurate to admit of satisfactory results, even though the actual observation left nothing to be desired. Errors of 30 degrees in longitude were by no means rare, and it was only when Kepler had published his "Rudolphine Tables" (1626), which, according to Lalande, formed the basis of all astronomical calculations during a century, that more exact results were obtained. The suggestion to determine longitude by means of lunar distances or occultations of stars bore no fruit at that time, as the knowledge of the complicated motion of the moon was still very imperfect. Still less was known about the movements of the satellites of Jupiter which Galileo had first espied in 1610 when looking at that planet through his telescope. They became available only after tables of their revolutions and eclipses had been published by Cassini in 1668.

Another suggestion for the determination of longitude was made by Gemma Frisius in 1530, namely, that a clock or timekeeper should be employed for the purpose. One of Huygens's pendulum clocks was actually carried by Holmes to the Gulf of Guinea, but the results obtained were far from encouraging.

The difficulties which still attended the determination of longitude in the sixteenth century are conspicuously illustrated by the abortive attempts of a Congress of Spanish and Portuguese navigators, who met at Badajoz and Yelves in 1524 for the purpose of laying down the boundary-line, which Pope Alexander VI. had drawn at a distance of 370 Spanish leagues to the west of Cape Verde Islands, to separate the dominions of Spain from those of Portugal. Not being able to agree either as to the length of a degree, nor even as to that of a league, they separated without settling the question placed before them.

So uncertain were the results of observations for longitude made during the sixteenth and seventeenth centuries, that it was thought advisable to trust to the results of dead-reckoning rather than to those of celestial observations. But the

method of dead-reckoning is available only when we have a knowledge of the size of the earth, and this knowledge was still very imperfect, notwithstanding the renewed measurement of an arc of the meridian by Snellius, the Dutch mathematician (1615). This measurement, however, is remarkable on account of its having for the first time applied the exact method of triangulation to a survey.

The problem of measuring the ship's way had been attempted by the Romans, who dragged paddle-wheels behind their ships, the revolutions of which enabled them to estimate the distance which the ship had travelled. But time, the strength of the wind, and the pilot's knowledge of the qualities of his ship, still constituted the principal elements for calculations of this kind, for the "catena a poppa" which Magellan attached to the stern of his ship was merely intended to indicate the ship's leeway and not the distance which it had travelled. The log, which for the first time enabled the mariner to carry out his dead-reckoning with confidence, is first described in Bourne's *Regiment for the Sea*, which was published in 1577.

The eminent position which Italian cartographers occupied during the fourteenth and fifteenth centuries had to be surrendered by them, in the beginning of the sixteenth, to their pupils, the Portuguese and Spaniards, upon whom extensive voyages and discoveries had conferred exceptional advantages. These, in turn, had to yield to the Germans, and later on to the Dutch, who were specifically qualified to become the reformers of cartography by their study of mathematics and of the ancient geographers, as also by the high degree of perfection which the arts of engraving on wood and copper had attained among them. German mathematicians first ventured to introduce the long-neglected geographical projections of Hipparchus and Ptolemy, and devised others of their own. Werner of Nürnberg (1514) invented an equivalent heart-shaped projection, whilst both Apianus and Staben (1520 and 1522) suggested equivalent projections. Still greater were the services of Gerhard Cremer, or Mercator (1512-94), the Ptolemy of the sixteenth century, who not only introduced the secant conical projection, but also invented that still known by his name, which was calculated to render such great service to the navigator, but was nevertheless not universally accepted until the middle of the fifteenth century, when the mediæval compass and plane charts finally disappeared.

The German cartographers of that age are to be commended, not because they copied Ptolemy's maps—for in this they had been preceded by others—but because they adopted his scientific methods in producing maps of their own. Their reforms began at home, as all reforms should. They were amply supported in their efforts by the many astronomers of note of whom Germany then boasted, and by quite a staff of local "geographers," of whom nearly every district of the empire boasted the possession of one. Among these local maps, that of Bavaria, by Philipp Bienewitz, or Apianus (1566), holds a distinguished place, for it is the first map on a large scale (1 : 144,000) based upon a regular survey. Its errors in latitude do not exceed 1′, and those in longitude 3′, which is marvellously correct considering the age of its production. Like most maps of the period, it is engraved on wood, for though the art of engraving on copper was invented in Germany before 1446, and the first map was engraved there in 1450, copper engraving only became general at a much later date.

Perhaps the earliest general map of Germany, and certainly one of the most interesting, was that which the famous Cardinal Nicolas of Cues or Cusa, completed in 1464, the only existing copy of which is to be found in the British Museum, where it was "discovered" by Baron Nordenskiöld. Mercator's map of Germany, published more than a century after that of the learned Cardinal (in 1585), was

naturally far more complete in all respects, and was certainly far superior to the maps of any other country existing at that time. This fact is brought home to us by an inspection of a collection of maps to be found in the well-known *Theatrum Orbis* of Ortelius (first published in 1570), where we may see that the maps supplied by Humphrey Lloyd and other British cartographers are still without degree-lines.

But when we follow Mercator, or, in fact, any other cartographer of the period, into regions the successful delineation of which depended upon an intelligent interpretation of itineraries and of other information collected by travellers, they are found to fail utterly. Nowhere is this utter absence of the critical faculty more glaringly exhibited than in the maps of Africa of that period.

The age of great discoveries was past. All blanks upon our maps had not yet been filled up ; but the contours of the great continents stood out distinctly, and in the main correctly. Discoveries on a large scale had become impossible, except in the Polar regions and in the interior of some of the continents ; but greater preciseness had to be given to the work already done, and many details remained to be filled in. In this "Age of Measurements," as Peschel significantly calls it, better instruments, and methods of observation superior to those which had sufficed hitherto, were needed, and were readily forthcoming.

Picard, by making use of the telescope in measuring angles (1667), obtained results of a degree of accuracy formerly quite unattainable, even with instruments of huge proportions. For the theodolite, that most generally useful surveying instrument, we are indebted to Jonathan Sission (1737 or earlier). More important still, at all events to the mariner, was the invention of the sextant, generally ascribed to Hadley (1731), but in reality due to the genius of Newton. Equally important was the production of a trustworthy chronometer by John Harrison (1761), which first made possible the determination of meridian distances, and is invaluable whenever a correct knowledge of the time is required. One other instrument, quite recently added to the apparatus of the surveyor, is the photographic camera, converted for his especial benefit into a photogrammeter. This instrument can perhaps never be utilised for ascertaining the relative positions of celestial bodies, but has already done excellent service in ordinary surveying, especially when it is required to portray the sides of inaccessible mountains.

But the full fruits of these inventions could be enjoyed only after Bradley had discovered the aberration of light (1728) and the nutation of the Earth's axis (1747) ; Domenique Cassini had furnished trustworthy tables of the refraction of light ; and the complicated movement of the moon had been computed by Euler (1746), Tobias Mayer (1753), Bradley (1770), and, more recently, by Hansen.

Positively novel methods for determining the latitude and longitude of a place can scarcely be said to have been proposed during this period ; but many of the older methods only became really available after the improvements in the instruments indicated above had taken place, and the computations had been freed from the errors which vitiated them formerly.

Real progress, however, has been made in the determination of altitudes. Formerly they could be ascertained only by trigonometrical measurement, or by a laborious process of levelling ; but since physicists have shown how the decrease of atmospheric pressure with the altitude, and the boiling-point of water depending upon this decrease, afforded a ready means of determining heights, the barometer, aneroid, and boiling-point thermometer have become the indispensable companions of the explorer, and our knowledge of the relief of the land has advanced rapidly.

Equally rapid have been the improvements in our instruments for measuring the depth of the ocean, since a knowledge of the configuration of its bed was demanded by the practical requirements of the telegraph engineers.

And in proportion as the labours of the surveyors and explorers gained in preciseness, so did the cartographer of the age succeed in presenting the results achieved in a manner far more satisfactory than had been done by his predecessors. His task was comparatively easy so long as he only dealt with horizontal dimensions, though even in the representation of these a certain amount of skill and judgment are required to make each feature tell in proportion to its relative importance. The delineation of the inequalities of the Earth's surface, however, presented far greater difficulties. The mole-hills or serrated ridges, which had not yet quite disappeared from our maps in the beginning of this century, failed altogether in doing justice to our actual knowledge. The first timid attempt to represent hills as seen from a bird's-eye view, and of shading them according to the steepness of their slopes, appears on a map of the Breisgau, published by Homann in 1718. We find this system fully developed on La Condamine's map of Quito, published in 1751, and it was subsequently popularised by Arrowsmith. In this crude system of hill-shading, however, everything was left to the judgment of the draughtsman, and only after Lehmann (1783) had superimposed it upon a groundwork of contours, and had regulated the strength of the hatching in accordance with the degree of declivity to be represented did it become capable of conveying a correct idea of the configuration of the ground.

The first to fully recognise the great importance of contours was Philip Buache, who had prepared a contoured map of the Channel in 1737, and suggested that the same system might profitably be extended to a delineation of the relief of the land ; and this idea, subsequently taken up by Ducarla of Vabres, was for the first time carried into practice by Dupain-Triel, who published a contoured map of France in 1791. Up to the present time more than eighty methods of showing the hills have been advocated, but it may safely be asserted that none of these methods can be mathematically correct, unless it is based upon horizontal contours.

The credit of having done most towards the promotion of cartography in the course of the eighteenth century belongs to France. It was France which first equipped expeditions to determine the size of the Earth ; France which produced the first topographical map based upon scientific survey—a work begun by César François Cassini in 1744, and completed by his son five years after his father's death ; it was France again which gave birth to D'Anville, the first critical cartographer which the world had ever seen.

Delisle (1675-1726), a pupil of Cassini's, had already been able to rectify the maps of the period by utilising the many astronomical observations which French travellers had brought home from all parts of the world. This work of reform was carried further by D'Anville (1697-1782), who swept away the fanciful lakes from off the face of Africa, thus forcibly bringing home to us the poverty of our knowledge ; who boldly refused to believe in the existence of an Antarctic continent covering half the southern Hemisphere, and always brought sound judgment to bear upon the materials which the ever-increasing number of travellers placed at his disposal. And whilst France led the way, England did not lag far behind.

In that country the discoveries of Cook and of other famous navigators, and the spread of British power in India, gave the first impulse to a more diligent cultivation of the art of representing the surface of the Earth on maps. There, to a greater extent than on the Continent, the necessities of the navigator called into existence a vast number of charts, amongst which are many hundreds of sheets

published by Dalrymple and Joseph Desbarres (1776). Faden, one of the most prolific publishers of maps, won distinction especially for his county maps, several of which, like that of Surrey by Linley and Gardner, are based upon trigonometrical surveys carried out by private individuals. England was the first to follow the lead of France in undertaking a regular topographical survey (1785). Nor did she lack critical cartographers. James Rennell (b. 1742) sagaciously arranged the vast mass of important information collected by British travellers in India and Africa ; but it is chiefly the name of Aaron Arrowsmith (died 1823) with which the glory of the older school of English cartographers is most intimately connected. Arrowsmith became the founder of a family of geographers, whose representative in the third generation, up to the date of his death in 1873, worthily upheld the ancient reputation of the family. Another name which deserves to be gratefully remembered is that of John Walker, to whom the charts published by our Admiralty are indebted for that perspicuous, firm, and yet artistic execution which, whilst it enhances their scientific value, also facilitates their use by the mariner.

Since the beginning of the present century Germany has once more become the headquarters of scientific cartography ; and this is due as much to the inspiriting teachings of a Ritter and a Humboldt as to the general culture and scientific training, combined with technical skill, commanded by the men who more especially devoted themselves to this branch of geography, which elsewhere was too frequently allowed to fall into the hands of mere mechanics. Men like Berghaus, Henry Kiepert, and Petermann, the best-known pupil of the first of these, must always occupy a foremost place in the history of our department of knowledge. Berghaus, who may be truly described as the founder of the modern school of cartography, and who worked under the immediate inspiration of a Ritter and a Humboldt, presented us with the first comprehensive collection of physical maps (1837). Single maps of this kind had, no doubt, been published before—Kircher (1665) had produced a map of the ocean currents, Edmund Halley (1686) had embodied the results of his own researches in maps of the winds and of the variation of the compass (1686), whilst Ritter himself had compiled a set of physical maps (1866)—but no work of the magnitude of Berghaus's famous Physical Atlas had seen the light before. Nor could it have been published even then had it not been for the unstinted support of a firm like that of Justus Perthes, already the publisher of Stieler's Atlas (1817-23), and subsequently of many other works which have carried its fame into every quarter of the globe.

And now, at the close of this nineteenth century, we may fairly boast that the combined science and skill of surveyors and cartographers, aided as they are by the great advance of the graphic arts, are fully equal to the production of a map which shall be a faithful image of the Earth's surface. Let us imagine for one moment that an ideal map of this kind were before us, a map exhibiting not merely the features of the land and the depth of the sea, but also the extent of forests and of pasture-lands, the distribution of human habitations, and all those features the representation of which has become familiar to us through a physical and statistical atlas. Let us then analyse the vast mass of facts thus placed before us, and we shall find that they form quite naturally two well-defined divisions—namely, those of physical and political geography, whilst the third department of our science, mathematical geography, deals with the measurement and survey of our Earth, the ultimate outcome of which is the production of a perfect map.

I shall abstain from giving a laboured definition of what I consider geography should embrace, for definitions of this kind help practical workers but little, and will never deter any one, who feels disposed and capable, from straying into fields

which an abuse of logic has clearly demonstrated to lie outside his proper domain. But I wish to enforce the fact that topography and chorography, the description of particular places or of entire countries, should always be looked upon as integral portions of geographical research. It is they which furnish many of the blocks needed to rear our geographical edifice, and which constitute the best training school for the education of practical geographers, as distinguished from mere theorists.

That our maps, however elaborate, should be supplemented by descriptions will not even be gainsaid by those who are most reluctant to grant us our independent existence among the sciences which deal with the Earth and its inhabitants. This concession, however, can never content us. We cannot allow ourselves to be reduced to the position of mere collectors of facts. We claim the right to discuss ourselves the facts we have collected, to analyse them, to generalise from them, and to trace the correlations between cause and effect. It is thus that geography becomes comparative; and whilst comparative physical geography, or morphology, seeks to explain the origin of the existing surface-features of our Earth, comparative political geography, or anthropo-geography, as it is called by Dr. Ratzel, one of the most gifted representatives of geographical science in Germany, deals with man in relation to the geographical conditions which influence him. It is this department of geography which was so fruitfully cultivated by Karl Ritter.

Man is indeed in a large measure "the creature of his environment," for who can doubt for a moment that geographical conditions have largely influenced the destinies of nations, have directed the builders of our towns, determined the paths of migrations and the march of armies, and have impressed their stamp even upon the character of those who have been subjected to them for a sufficiently extended period?

The sterile soil of Norway, bordering upon a sea rich in fish, converted the Norwegians first into fishermen, and then into the bold mariners who ravaged the shores of Western Europe and of the Mediterranean and first dared to cross the broad waves of the Atlantic. Can it be doubted that the uniformly broad plains of Eastern Europe contributed largely to the growth of an empire like that of Russia, stretching from the Arctic to the Black Sea; or that the more varied configuration of Western and Southern Europe promoted the development of distinct nationalities, each having a history of its own and presenting individual traits which characteristically mark it off from its neighbours?

The intelligent political geographer cannot contemplate the great river-systems of the continents without becoming aware that their influence has been very diverse and is not solely dependent upon size or volume. The rivers of Siberia, ice-bound during the greater part of the year, run to waste into an inhospitable ocean, which even our modern resource of steam has failed to render really accessible. They contrast very unfavourably, notwithstanding their huge size, with the far smaller rivers of Northern Europe, which open freely into the sea and afford navigable highways into the very heart of the continent. And these European rivers, fed as they are by rain falling in all seasons, and by the ice stored up in the recesses of the Alps, again differ very widely in their character from the rivers of Tropical regions, dependent upon an intermittent supply of rain. Again, who can look upon such mighty rivers as the Amazons and Mississippi without becoming conscious of the fact that they have given geographical unity to regions of vast extent which, had their drainage been different, would have presented all the variety which we meet with in Europe—a variety which has proved so favourable to the progress of human culture and civilisation?

It is an old remark that climatic conditions exercise a most powerful influence upon man, and that the development of countries, where Nature yields the necessaries of life without requiring a serious effort on the part of the inhabitants, has been very different from those whose climatic conditions compel the putting forth of a certain amount of well-directed energy to make life bearable, or even possible.

These instances of the dependence of human development upon natural resources and geographical features might be multiplied, and their study must at all times be profitable and instructive. It must not, however, be assumed for one moment that this dependence of man upon Nature is absolute. The natural resources of a country require for their full development a people of energy and capacity ; and instances in which they have been allowed to lie dormant, or have been wasted, are numerous. What were America and Australia, as long as they remained only the homes of the wandering savages who originally inhabited them ; and what has become of certain countries of the East, at one time among the most flourishing regions of the Earth, but presenting now a most deplorable picture of exhaustion and decay ? The geographer must not shut his eyes to the fact that the existing state of affairs is not merely the outcome of given geographical conditions and natural resources, but has in a large measure been brought about by man's conquests over the forces of Nature. We do not exaggerate, for instance, when we assert that the introduction of steam as a motive-force has largely changed the geographical relations of countries. By facilitating intercourse between distant regions and encouraging travel, it has tended to uniformity among nations, and rendered available for the common good resources which otherwise must have lain fallow. A tunnel, such as that under the Saint Gotthard, may not have 'abolished' the Alps, but it certainly has brought the populations who occupy their opposite slopes nearer to each other, and has given a new direction to commerce.

Perhaps one of the most instructive illustrations of the complex human agencies which tend to modify the relative importance of geographical conditions is presented to us by the Mediterranean. The time when this inland sea was the centre of civilisation and of the World's commerce, whilst the shores of Western Europe were only occasionally visited by venturesome navigators or conquering Roman hosts, does not lie so very far behind us. England, at that period, turned her face towards Continental Europe, of which it was a mere dependency. The prosperity of the Mediterranean countries survived far into the Middle Ages, and Italy at one time enjoyed the enviable position of being the great distributor of the products of the East, which found their way across the Alps into Germany, and through the gates of Gibraltar to the exterior ocean. But a change was brought about, partly through the closing of the old Oriental trade-routes, consequent upon the conquests of the Turks, partly through the discovery of a new world and of a maritime highway to India. When Columbus, himself an Italian, returned from the West Indies in 1493, and Vasco da Gama brought the first cargo of spices from India in 1499, the star of Italy began to fade. And whilst the spices of the Indies and the gold of Guinea poured wealth into the lap of Portugal, and Spain grew opulent on the silver mines of Mexico and Peru, Venice was vainly beseeching the Sultan to re-open the old trade-route through the Red Sea. The dominion of the sea had passed from Italy to Spain and Portugal, and passed later on to the Dutch and English. But mark how the great geographical discoveries of that age affected the relative geographical position of England ! England no longer lay on the skirts of the habitable world, it had become its very centre. And this natural advantage was enhanced by the colonial policies of Spain and Portugal, who exhausted their strength in a task far beyond their powers, took possession of tropical countries only, and abandoned to England the less attractive but in reality far more valuable

regions of North America. England was thus enabled to become the founder of real colonies, the mother of nations ; and her language, customs, and political institutions found a home in a new world.

And now, when the old highway through the Red Sea has been reopened, when the wealth flowing through the Canal of Suez is beginning to revivify the commerce of Italy, England may comfort herself with the thought that in her own colonies and in the States which have sprung up across the Atlantic she may find ample compensation for any possible loss that may accrue to her through geographical advantages being once more allowed to have full play.

I am afraid I have unduly tried your patience. I believe you will agree with me that no single individual can be expected to master all those departments which are embraced within the wide field of geography. Even the master-mind of a Humboldt fell short of this, and facts have accumulated since his time at an appalling rate. All that can be expected of our modern geographer is that he should command a comprehensive general view of his field, and that he should devote his energies and capacities to the thorough cultivation of one or more departments that lie within it.

INTERNATIONAL GEOGRAPHICAL CONGRESS, 1891.

The fifth International Geographical Congress was held at Berne, from 10th to 14th August, 1891.

The Honorary Presidents were H.M. the Emperor Dom Pedro II., H.M. King Leopold II., H.S.H. Albert Prince of Monaco, and the members of the Federal Council of Switzerland. The Honorary Committee was composed of the presidents of the geographical societies of twenty-two cities. Over fifty societies were personally represented at the Congress. Professor Paul Chaix and Professor Emile Chaix represented the Royal Scottish Geographical Society, the latter unofficially.

The papers read at the Congress were of high value, and will be published before the end of the year. They were too numerous to admit of adequate analysis in this place, and their mere mention would serve no useful purpose. We prefer, rather, to devote our space to the following description of the admirable exhibition of geographical appliances, for which we are indebted to Professor Emile Chaix.

The exhibition was organised by the Geographical Society of Berne, and was divided into three divisions :—(1) School geography, (2) Alpine exhibits, and (3) the progress of Swiss cartography. It was, therefore, only the first division which offered opportunities for international competition. Unhappily, the United Kingdom was scarcely represented at all. Russia sent no exhibits, the United States only Coast Survey maps, and Spain very few of any kind. France and Belgium were well represented, as also were Germany, Austria-Hungary, and Italy. The Swiss exhibits were, of course, the most numerous.

Professor Emile Chaix is responsible for the following remarks on the character of the various exhibits.

Austria-Hungary sent a well-selected and graduated collection of geographical publications, including many excellent atlases—a large number edited by Hölzel of Vienna—school-books, and reliefs. Of special interest were the wood-reliefs of the basins of Austrian lakes.

The wall-maps were very satisfactory, both in their artistic and scientific execution. Maps deserving special mention were those by M. von Haardt (Hölzel), *The Isothermal Map of the World* (1 : 3,000,000) by Dr. Supan, and one of *The*

Ethnology of Asia (1 : 8,000,000) by M. Haardt von Hardtenthurm. Another excellent and painstaking work was the *Relief of Africa* (1 : 1,600,000) by Lieutenant G. Guttenbrunner which has been adopted for use in Austrian schools. The *Physical and Statistical Hand-Atlas* is a credit to Austria-Hungary. Of great interest, too, were the maps sent by the Geographical Institute of the University of Vienna, especially Dr. A. Penck's wall-map of *The World's Glaciers*, another of the *Glacial Conditions in the Alps*, by MM. Penck, Brückner, and Bœhm, on the same scale (1 : 600,000) as Von Haardt's *Alps*, and Herr Mullner's *Lakes of the World*, distinguishing between fresh-water lakes and those of brackish or salt water.

Belgium was represented by the numerous and good school-books of M. Du Fief, and by many atlases and other works by Brother Alexis, whose publications, being chiefly produced at Paris, are scarcely to be regarded as Belgian.

Although Russia was not, properly speaking, represented at all, the Geographical Society of Finland sent some fairly good exhibits, among which may be mentioned the works of Nordmann and Reuter, a *Geological Map of Finland*, and a large topographical map of *Finland* (1 : 400,000), which, although out of date, was very interesting.

French exhibits were somewhat disappointing, in spite of the well-earned reputation of France for artistic reproduction and for her progress in geographical science. The engraving of the maps was not satisfactory, and the colouring sometimes extremely bad. In the school-maps physical features were in many instances very much neglected. But if the general appearance of French exhibits was somewhat disappointing, no praise can be too high for the work of individual exhibitors. Hachette and Co. sent some of their important works, as, for instance, M. Vivien de St. Martin's *Universal Atlas*, which is unsurpassed for the beauty of its engraving, and M. Meissas' *Hypsometrical Map of France* (1 : 1,250,000), which was well coloured. Works of such recognised importance as M. Reclus' *Universal Geography*, and M. de St. Martin's *Dictionary of Geography* only require mention for their value to be universally admitted. The firm of Erhard Brothers exhibited a capital atlas by MM. Schrader, Prudent, and Anthoine. Finally, it is worth noting that only five out of the 326 French exhibits were produced out of Paris.

The German exhibits were, as might be expected, of unsurpassed excellence. There were Dr. Kiepert's well-known wall-maps, and others by Wagner and Debes. Kiepert's maps, it is worth mentioning, are reduced to a uniform scale : the continents to 1 : 8,000,000 and European countries to 1 : 1,000,000. Herr A. Oppel, of Bremen, showed an interesting manuscript map of the World illustrating the progress of our knowledge of the Earth since the Middle Ages. We should not forget to mention *Andree-Putzger's Atlas*. But the famous firm of Justus Perthes sent by far the most notable exhibits : all were excellent, from the *Pocket-Atlas* up to the last editions of *Stieler* and *Berghaus*. The *Physical Atlas* of Berghaus is, of course, without a rival. Sydow-Habenicht's physical and political wall-maps are specially deserving of mention as being among the best of their kind. German exhibits were no less important as regards books, for we find such well-known works as Ratzel's *Anthropogeography*, Hann's *Climatology*, Boguslawski-Krummel's *Oceanography*, Fritsch's *Geology*, Gunther's *Mathematical Geography*, Drude's *Botanical Geography*, Heim's *Glaciers*, van Bebber's *Meteorology*, and Gunther's *Physical Geography*. All these works are among the leading authorities in their respective subjects.

Of Italian exhibits the publications of Paravia, including as they do the works of Professor Guido Cora, were highly important.

The Swedish collection was very interesting. There was a large map, 7 feet

high, by M. Roth, of the *Hypsometrical and Bathymetrical Conditions of Scandinavia*, which was an admirable production on the scale of 1 : 1,000,000. Of even greater excellence, however, was a similar map of *Southern Sweden* (1 : 500,000) executed at the Military Lithographic Institute, in thirteen gradations of light-brown, and several colourings of blue. Finally, Nordenskiöld's interesting *Facsimile Atlas* should be mentioned.

Although Switzerland sent 600 exhibits to the division of School Geography, some of the Cantons were not represented at all. The collection was, however, a good one. For scientific exactness, technical execution, and their artistic appearance the Swiss maps were generally good. There were a large number of excellent wall-maps and reliefs. Of special importance were the map of *Swiss Glaciers* by M. Favre, and the geological Reliefs of certain Cantons by Professor Heim and M. Imfeld, on the scale of 1 : 25,000.

The Alpine exhibits included many beautiful Reliefs. But the most interesting part of the whole exhibition was that illustrating the progress of Swiss cartography. For the purpose of classification, the exhibits were divided under three sections—(1) Maps up to 1790 ; (2) the transitional period, from 1790 to 1832 ; and (3) maps of recent date. A brief reference to this interesting collection may be permitted to us. We have first the *Tabula Peutingeriana* (193-211), the *Tabula Galliæ Belgicæ* (1482), out of the Ptolemaic edition of Nicolas Donis, three other specimens of the fifteenth century, twenty-three of the sixteenth, and others of later periods. All these old maps were very interesting, especially that of the *Canton of Zurich* by C. Gyger (1668), which is remarkably well constructed, and accurate for the time. The transition period of cartography showed very slow progress ; but the recent maps are quite unsurpassed for their excellence. The map of *Canton of Zurich* (1 : 25,000) by Professor Wild is so exact that railways could be constructed without further levellings of the country being required. Then there were copies of General Dufour's map and of the excellent *Atlas Siegfried*, now being published. The most recent maps were chromo-lithographical reproductions of Siegfried's maps, and those showing soundings in Swiss lakes.

The Jury intrusted with the task of examining these exhibits and awarding prizes was composed of the following members:—General von Arbter, Colonel Coello, Professor Du Fief, Mr. Scott Keltie, Professor Kempe, M. de Lannoy de Bissy, Professor Ratzel, and Professor Forel. All Government institutions, or over one-half of the exhibitors, were excluded from the competition. Forty-five prizes were awarded—eleven to Switzerland, seven to Germany, seven to Austria-Hungary, six to France, four to Italy, three to Sweden, two to Belgium, and two to Finland.

The only really important conclusion, among the numerous resolutions passed, was the proposal of Professor Penck for the compilation by international co-operation of a map of the World on a scale of 1 : 1,000,000. Full reference to this important undertaking is made in our *Geographical Notes* (page 557) for this month.

On the question of the next Congress coming up for discussion, it was agreed that it should take place in London, if the Royal Geographical Society issued an invitation, otherwise at Budapest ; and that in future the Congress should meet at intervals of from three to five years. Geographical Societies were requested to send deputations to Genoa and Madrid on the occasion of the celebration of the fourth centenary of the discovery of America.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

Lake Vyrnwy.—In connection with the engineering works, constructed to supply Liverpool with water from the valley of the Vyrnwy, a new geographical feature has come into existence. A dam, 1165 feet long, has been constructed across the valley, so as to confine the water of the river and form a lake $4\frac{3}{4}$ miles long by $1\frac{1}{2}$ mile broad. Its area is 1121 acres, and it can contain 2103 million cubic feet of water. Bala Lake is, therefore, no longer the largest in Wales. The new lake is situated in the county of Montgomery, 10 miles to the south-west of Bala Lake. Between them run the Berwyn Mountains, which here form the watershed between the drainage-areas of the Dee and Severn, and mark the boundary of the county.

Census of Austria-Hungary.—On December 31, 1890, the population of the monarchy (excluding Bosnia and Herzegovina) was 28,835,261. The increase in the urban population since 1880 has been very marked. Vienna has now a population of 853,463, as against 704,756 in 1880. Three other towns contain more than 100,000 inhabitants each, namely: Budapest, 161,946; Trieste (with its territory), 157,648; and Graz, 106,946. The Magyars number 8,200,000, and constitute nearly half of the population of Hungary.—*Revue Française*, June 1.

ASIA.

The Indian Marine Survey.—We have received the annual *Administrative Report* from Commander Hoskyn, and give below the principal results of the season's work, taken from the pages of that useful and always interesting blue-book. The first investigation noted by Commander Hoskyn was undertaken in the neighbourhood of Masulipatam, where the relative positions of the lighthouse of Divi Point, the mouth of the river, and the adjacent coast-line were fixed. The shoals between Ennore and Pulicat were next examined, as considerable changes had been reported to have taken place among them; but, although soundings were carried out to the 100-fathom line, no material alterations could be discovered. The *Investigator* then sailed for Bombay, where the officers and chart-room staff were sent on to Poona, as usual, to work up the results obtained. On resumption of the survey proper, in October, the Cocos Islands were first visited, and a party was left on Table Island to make the necessary observations, while the *Investigator* steamed to Port Blair, and took Surgeon David Prain on board to resume his investigations anent the flora of the Cocos Islands. A rock reported in Manners Strait, with only 3 fathoms of water over it, was next sought for, and, after some trouble, located; but its position does not render it dangerous, as had been feared, to ships running between Port Blair and Madras. The survey of the east coast of India was then resumed, and carried on up to lat. 16° 50′ N., including a plan of Cocanada anchorage, which is supposed to have been affected by the action of the Godavari River. The boat party, under Lieutenant Gunn, continued the survey of the Bassein River, and for five months made continuous tidal observations at Diamond Island. After joining the staff at Poona, Lieutenant Gunn proceeded to the coast of Persia, and completed a survey of the approaches to the Bahmishir and Shatt-al-Arab Rivers. Thereafter the party visited Veraval, the examination of which was proceeding in February when the commanding officer addressed his report to Commander Hoskyn.

Surgeon Alcock reports at considerable length on his deep-sea investigations. These are full of interest, and, under his guidance, assume more and more importance. The number of deep-sea fishes in the collection now amounts to 100 species, compared with 160 species in the *Challenger* gatherings, and 120 species obtained in the *Travailleur* and *Talisman* expeditions. The observations made at the Cocos Islands are also included in Dr. Alcock's report, from which the following particulars are taken :—

Great Coco Island presents considerable diversity in surface features. The south end is low, with a soil composed of sand and coral shingle, covered with a growth of the screw pine, *Ipomœa*, etc. To the north the scenery completely changes. Here, steep and rocky declivities are everywhere present, clothed with forest trees and thorny creepers. From the central heights a spur runs out into the low, flat region of the south, where a considerable amount of jungle was met with. The fact is noted that both on the flat land here and throughout Little Coco Island young palms sustain no injury whatever from the swarming land crabs. Jerry Island is connected with Great Coco Island by a reef, dry at low water, and is a barren, rocky spot, except to the north, where *Ipomœa lobata* flourishes luxuriantly on the low sand and coral soil. Palms, cycads, screw-pines, etc. also grow here. A small islet, between Jerry and Great Coco, is composed of an accumulation of coral shingle, dead shells, drift timber, coco-nuts, and woody fruits. This island appears to be increasing in size, and vegetation has already begun to make some progress. The exposed part of the reef, mentioned above, is of sandstone, hard, and dark in colour, passing into a breccia-conglomerate "traversed by fine laminæ of crystalline limestone, which are so irregularly inclined to the general plane of stratification as to recall the appearance of an intrusive rock. The strata at the south end of the island are much folded ; they dip at an angle of about 60° east, south-east, south-west, and west, and this was verified in other parts of the island and on Little Coco Island." Masses of branching corals, chiefly *Pocillopora* and *Madrepora*, were observed surrounding the rocky tidal pools around the coast, where an asterid also occurs, but less frequently. The pools are choked with masses of a *Porites*, which, having grown peripherally, often form great circular discs of 15 feet in diameter. Little Coco Island is about $2\frac{1}{4}$ miles long by from $\frac{1}{4}$ to $\frac{1}{2}$ a mile broad, and has a ridge of elevation traversing it from one end to the other and running out into the sea in the form of a line of rocks. The dips of the strata were the same as those observed at Great Coco Island, with the exception of some on the west side, which were inclined north-west and north-north-east. "And this seems to prove," adds Surgeon Alcock, "that the Cocos group is a distinct little centre of elevation." The flora mostly consists of palms, *Ipomœa lobata*, screw-pines, forest trees, *Calamus*, and a variety of thorny shrubs and creepers. The vegetation is exceedingly dense, and comes so near the coast-line that, at high tides, only a narrow strip of sand is left exposed. Turtles frequent the west shores for the purpose of making their nests, and are followed by swarms of big water-lizards (*Hydrosaurus salvator*), which prey upon their eggs. There is a small lake upon the island, separated from the sea by a strip of jungle, and its water is sufficiently fresh to be potable ; it covers an area of several acres, and has a depth of from 6 inches to 2 feet, its bottom being completely covered with the fresh-water alga *Chara*, small patches of lotus floating upon its surface. Teal and fish were seen here, but none of the latter were caught. Mangroves continue to flourish, though the water is practically fresh. Pigs abound on Little Coco, although they do not appear to occur on the larger island, and *Trepang* is so abundant and of such good quality as to point to its commercial importance.

Annexed is a table showing the principal soundings made within the period

covered by the *Report*, with the bottom temperature and deposits in separate columns. The particulars are taken from Surgeon Alcock's excellent contribution.

Position.	Fathoms.	Bottom Temperature. Fahr.	Nature of Bottom.
Lat. 18° 30′ N., long. 84° 46′ E.	98 to 102		Hard Sand.
Lat. 18° 26′ N., long. 85° 24′ E.	1310		
Between lat. 15° and 17° N., and long. 81° to 83° 30′ E. . .	630 to 1260	36·0 to 41·0	Brown or Blue Mud.
Off Elicapeni Shoal . . .	1000	38·6	Olive Mud, with a few shells of *Foraminifera*.
Lat. 15° 2′ N., long. 72° 34′ E. .	740	44·0	Coral Mud.
Between lat. 7° 50′ N. and 10° N., and long. 75° and 78° E. .	738 to 1100	37·5 to 42·0	Green Mud.
Lat. 9° 34′ N., long. 85° 43′ 15″ E.	1997	35·0	*Globigerina* Ooze and Pumice.
Lat. 12° 50′ N., long. 90° 52′ E.	1644	35·4	*Globigerina* Ooze.
Lat. 13° 47′ 30″ N., long. 92° 36′ E.	561	44·9	Grey Mud.[1]
Lat. 12° 59′ N., long. 93° 23′ 10″ E.	683	42·9	Blue Mud.
Lat. 13° 21′ N., long. 93° 27′ E.	922	41·2	Dense Blue Mud.
Lat. 11° 31′ 40″ N., long. 92° 46′ 40″ E.	188 to 220	56·0	Green Mud.
Near the above . . .	405	47·0	Green Mud.
Lat. 11° 58′ N., long. 88° 52′ 17″ E.	1748	35·3	*Globigerina* Ooze, with bits of water-worn Pumice.
Lat. 12° 20′ N., long. 85° 8′ E. .	1803	35·0	
Off mouth of the Kistna . .	95	66·5	
A few miles NE. of above .	240 to 276	52·0	Brown Mud (River Deposit).

AMERICA.

Rio Grande do Sul, Brazil.—In the *Zeitschrift der Gesellschaft fur Erdkunde zu Berlin*, Bd. xxvi., No. 2, Dr. Hettner has given a long description of the most southern province of the republic of Brazil. This province has an area of 91,500 square miles. Its northern part is occupied by the table-land of Brazil, which extends from Matto Grosso and Minas Geraes through São Paulo, Parana, and Sta. Catarina, while to the south of 29° 40′ S. lat., or thereabouts, the country is gently undulating and forms, geographically, part of the lowlands of Paraguay. The boundary between the table-land and low country is marked by the Serra Geral, a continuation, though running in a different direction, of the Serra do Mar of the more northern provinces. At about 54° 30′ W. long. this range sinks down and disappears, and the table-land to the west passes imperceptibly into the low country. The geological corresponds to the geographical formation, the low country east of 54° 30′ W. long. consisting of archaic rocks—granite, gneiss, slates, etc., while in the northern and western parts of the province red sandstone, trap, and amygdaloid rock cover the surface. From the fact that sandstone is found in isolated deposits in the south-west Dr. Hettner has arrived at the conclusion, confirmed by several other data, that the sandstone originally extended over

[1] By this haul it was proved that some crustaceans living in the depths of the ocean are, like certain fishes, provided with special light-producing organs.

the whole country. Along the coast lies a stretch of flat land, formed by the denudation of the interior. Here long lines of white sand-banks enclose numerous lagoons. At the north, where the table-land approaches very near to the Atlantic, the banks and lagoons are of small size, but in the south the sand attains a considerable breadth, sheltering the large Lagõa dos Patos and Lagõa Mirim. The former has a length of about 125 miles and a breadth, from NE. to SW., of 25 to 30 miles. Its depth does not exceed 30 feet, so that large vessels have to follow a channel marked out by buoys, and often run aground. At the southern end it is connected with the sea by the Canal do Norte, or Rio Grande, a winding channel obstructed by numerous islands and much contracted at its outer end. At an earlier period the Lagõa dos Patos probably occupied the valley of the Jacuhy River, and bays projected up the Camacuan and Jaguarão, as is proved by the marine shells and whale bones found on the banks of these rivers. Now the rain-water carried down by the rivers makes the water of the lagoon fresh in summer, while in winter the sea-water rushes in through the Rio Grande over the southern half of the lagoon, and sometimes even penetrates by the São Gonçalo Canal into the Lagõa Mirim, rendering its waters brackish as far as Ponta Negra—in very dry weather even to the southern extremity. It is not astonishing that fish are scarce in the lagoon, for the alterations of fresh and salt water are in turn destructive to the fresh-water and marine fauna. The navigation of the Rio Grande is a very important question for the prosperity of the State, since it possesses no good harbour on the outer coast. A bar at the mouth, produced partly by the meeting of the current from the Rio Grande with the coast stream, and partly by sand carried by the wind, leaves a free channel only 9 to 12 feet deep. The large transatlantic steamers are therefore unable to enter the Rio Grande, and for smaller steamers and sailing vessels the crossing of the bar is attended with great danger. The sandy banks of the Rio Grande have been planted to keep the sand from being carried away by the wind, and it is proposed to form a channel by means of gabions.

The town which would in the greatest degree be benefited by an improved waterway is Rio Grande, situated in a bay on the western shore of the channel. It was for a long time the only commercial town of the province, but of late the trade has been drawn more and more to Pelotas and Porto Alegre. Rio Grande now contains a population of 15,000. Pelotas, with a population of 30,000, lies on the Rio Gonçalo, at a distance of 6 miles from the lagoon. It owes its importance to large slaughter-houses, where 300,000 head of cattle are killed yearly. It possesses also tanyards and hat manufactories. Porto Alegre is situated at the northern end of the lagoon, on the river Guahyba. It is the political capital of the province, and contains the largest population, the number of its inhabitants being between 40,000 and 50,000.

The hilly country begins at some distance inland, being visible from the lagoons only in faint and unimposing outlines, though towards the east it attains a comparatively high elevation in the Serra dos Tapes and the Serra do Herval. In geographical descriptions of the country many other chains are mentioned—*cochilhas* as they are called—which are, however, nothing more than broad ridges that owe their existence to the erosion of the adjacent valleys. The Cochilha Grande, which traverses the whole country from the River Plate to Santa Maria, is simply the watershed between the ocean and the tributaries of the Uruguay. Only the eastern slopes of the Serra dos Tapes and Serra do Herval are clothed with forest; the rest of the country is a boundless grassy steppe, where trees are to be found only in small strips beside the streams, and where dreary solitude is the most striking characteristic. Among the grass may be seen the blossoms of

several varieties of plants, such as verbenas, lilies, *Amaryllidaceæ*, and, by the streams near the *serras*, fuchsias. Near San Francisco flourishes the dwarf *Butia* palm. The only large animals met with are herds of deer and troops of ostriches : wild boars and herons frequent the rivers. The steppe is utilised as grazing ground for cattle and horses, and, in some parts, for sheep. They receive little attention from their owners, and no efforts are made to improve the breed. The small ugly horses are wanting in strength and power of endurance, and do not even satisfy the requirements of the province, better horses being imported from Uruguay. The cattle yield the principal articles of export. They are slaughtered to the number of one million yearly. Formerly only the hides were made use of, but now dried beef, or *charqui*, is exported in large quantities to the northern provinces of Brazil, and the hair and hoofs, as well as the hides, are exported to Europe. Few sheep are kept, and those yield little else than wool for the factories of Rio Grande. Agriculture in the grass land is pursued only to supply the wants of the settlers. Near their houses are seen small plantations of maize, beans, and manioc.

Minerals exist in many parts of the steppe, but they have as yet done little for the development of the country. Silver ore has been found near Caçapava and Lavras, but it is too poor to yield a profit on the working expenses. Iron ore is found in several places, and is said to be of good quality, but it has never been worked. Several coal-fields lie among the archaic rocks, in strata of white and red sandstone, of which one, on the Arroyo dos Ratos to the south of San Jeronimo, has been worked since 1857. The coal is sold to the railway and the steamers plying on the Rio Jacuhy. The large proportion of sulphur contained in it renders it useless in ironworks.

The roads are merely tracks worn by horses' hoofs and waggon-wheels. There are two railways ; the one from the Rio Taquary, a little above its confluence with the Jacuhy, to Santa Maria, whence it is to be continued to Uruguayana ; the other running from Rio Grande through Pelotas to Bagé, which will ultimately join the former line at Cacequy. Steamers ply daily from Porto Alegre, some to the railway terminus on the Taquary, or, when the water permits, to the town of Taquary or to Estrella, others along the Upper Jacuhy to the Rio Pardo and Cachoeira. On the Uruguay steamers run from the rapids at Salto up to the Paso San Isidro, and, as the population in the west becomes more numerous, the traffic on this river will gain in importance. The inhabitants of this region live mostly in scattered farms. A few towns of about 5000 inhabitants, such as Jaguarão, Bagé, Santa Anna, San Gabriel, and others, are found where agriculture is pursued or trade can be carried on advantageously. The inhabitants, except a few officials, traders and artisans, are Gaucho herdsmen, having a smaller admixture of Indian blood than the people of Uruguay and Argentina and being, consequently, superior in type and manner of life. Europeans, among whom Germans are most numerous, dwell almost exclusively on the eastern forest lands. The colony of San Laurenço, not far from Pelotas, is very flourishing, and contains 12,000 to 15,000 German settlers.

The Serra Geral, which, as already mentioned, separates the undulating country from the northern table-land, is, physically, only an outlying portion of the latter. It is an aggregation of isolated mountains and long ridges, with gently sloping flanks, clothed with vegetation. Trees of many different varieties grow to a height of 30 or 40 feet, and their stems are covered with orchids and *Bromeliæ*, and their branches are festooned with climbing plants. High up on the ridges, and more especially near the table-land, the *Araucaria Brasiliensis* is the most conspicuous tree. The fauna is poor, consisting principally of howling monkeys and parrots. The settlers are mostly German and Italian immigrants, who have made clearings

in the forest, where they plant oranges, coffee, sugar, maize, beans, manioc, and occasionally small quantities of rye, wheat, and barley. Though seldom accumulating riches, they maintain themselves in comfort.

The table-land has, in general, a character similar to that of the low country. Grassy plains may be seen extending to the horizon, with here and there a solitary hut. But if the traveller leaves the beaten tracks, he will frequently come across more diversified country, where flower-bedecked meadow land lies surrounded by luxuriant green foliage. Araucarias and *maté* are the most prominent trees, but in sheltered spots more pleasing forms are often met with, such as fan-palms, the *Butia* palm, and ironwood. Cattle, horses, and mules have usurped the domains of the native wild animals, which are now found only in the north and west, where human settlements are few and far apart. Here may be seen deer, ostriches, partridges, and numerous birds of prey. The absence of means of communication has hindered the development of the country. The streams are small, and form rapids at the edge of the table-land. Even the Uruguay is encumbered by numerous rapids, which are an obstacle to a regular steamboat service. Consequently, the population is more sparse than in other parts of the province, and the settlements have a poverty-stricken appearance.

The climate of Rio Grande is sub-tropical. The mean annual temperature on the coast is about 64° to 66° F. In the warmest month, January, the mean rises to 75° or 77° and in the coldest, July, falls to 54° or 56°, so that the yearly range is only about 21°. In the summer of 1883 the thermometer rose in the coastal region on one occasion to 102°, but in other years the maximum has not exceeded 93°. In the southern part of the table-land the thermometer has been known to fall to 25°. The ground is often covered by hoar frost in winter. Rain falls in all seasons, but chiefly in winter, from June to September. In the town of Rio Grande 40 per cent of the total rainfall is recorded during these months. Snow is uncommon, though deep falls have occurred, as in 1879, when many thousands of cattle and horses perished on the table-land.

Tierra del Fuego.—M.M. Rousson and Willems have completed the exploration of the northern extremity of the main island of Tierra del Fuego, and have communicated the results to the French Minister of Instruction (*Compte Rendu* of the Paris Geo. Soc., Nos. 7 and 8, 1891). The part referred to is bounded towards the south by a line drawn from Useless Bay to the Bay of San Sebastian. It is traversed by a chain of mountains, which rises suddenly at Cape Boqueron to a height of 1600 feet, and terminates at Cape Espiritu Santo. The rest of the country consists of great plains watered by numerous rivers, many of which dry up in summer. The most important is the Rio del Oro, which flows into Philip Bay. Tierra del Fuego has a great variety of climates, but on the whole the cold is not as severe as might have been expected. The lowest temperature observed was 43° F., and the highest 69°. The nights are always cold. The barometer is subject to very sudden and considerable changes, and the winds are frequent and violent, those from the west often attaining a velocity of nearly 1000 feet per second. The Onas, who inhabit the northern part of the island, are very tall, sometimes 6 feet 6 inches, or more, in height. They are copper-coloured, have oval faces and long hair plastered with clay, small eyes, prominent cheek bones, large mouths, and a few hairs on the chin. Their only clothing is a cape of guanaco or fox skin and, sometimes, a triangular covering of leather on the head. The men occupy themselves solely in fighting with their neighbours and hunting, their chief weapons being bows and arrows tipped with pieces of glass, found on the shore, or flint. All the household labour falls on the women. Their encampments consist of circular holes, 5 feet in

diameter and 16 inches deep, dug out on the side of a mountain, with stakes set up round them to support a covering of skins. The Onas are not cannibals, as some travellers have asserted, nor do they burn their dead. The native population cannot be estimated at more than 300, but in summer the number of inhabitants is largely increased by miners, who return to Punta Arenas in winter. The flora of the country is poor, no trees growing in the north of the island and but few shrubs. Quadrupeds are scarce, the principal being the guanaco, dog, fox, and one or two small rodents, but snipe, ducks, geese, owls, swans, and other birds are plentiful. Magnetic iron is widely distributed and in large quantities, and gold, mixed with very small garnets and rubies, is found in several places. There are also some coal seams of very poor quality, and abundance of clay suitable for the manufacture of earthenware. It is probable that the land will in time be taken up for grazing purposes. Within the last few years several small farms have been established and have yielded large returns. On Dawson Island the Jesuits have a model farm, where nearly 20,000 sheep and more than 6000 cattle are fed.

GENERAL.

Proposed Colossal Map of the World.—Professor Penck of Vienna has originated a proposal to construct a Map of the World on the scale 1 : 1,000,000, or about 16 miles to an inch, and an international committee of about twenty-five cartographers has been formed to concert measures and draw up regulations for its execution. A globe on the same scale was exhibited in the Paris Exhibition of 1889. Its diameter must have been nearly 42 feet and its surface about 5500 sq. feet. The construction of a map of the land surface only will, therefore, be a gigantic undertaking. Professor Penck, in the *Beilage zur Allgemeinen Zeitung*, No. 141, estimates the area of the paper required for the delineation of the land-surface of the known World at 1614 sq. feet, of which 107 will be devoted to Europe and more than 484 to Asia. The British Isles will occupy about 4 sq. feet. It may be calculated that the map would require about 620 sheets, *Royal* size, and would form twelve volumes, each rather larger than Johnston's *Royal Atlas*. Large as these dimensions are, they are far less than those of the cadastral survey maps of many countries of Europe, and the feasibility of the construction of the proposed map cannot be doubted. Before the work is commenced many details will, naturally, have to be discussed. As regards the size of sheet, Professor Penck proposes that each should extend over three degrees of latitude and, at the Equator, over four degrees of longitude, so that the sheets may approximate to the commonly-used size of 3 to 4 decimètres broad by 4 to 5 long (about 14 in. by 18). In higher latitudes, where the meridians lie closer together, a larger number must be included. The map might then be issued in 1000 sheets, each sheet costing £100 to produce, according to Dr. Penck's estimate, or £100,000 for the whole work. The amount of detail shown will, of course, vary greatly with the character of the country and the information acquired. Another very important and difficult question is the spelling of geographical names and, particularly, their transliteration from languages not written in Roman characters. If the construction of this map should lead to the adoption of a more uniform system, the labours of all who are engaged in geographical literature will be considerably lightened. Perfection in this direction is not to be expected, but it is to be hoped that the Geographical Congress at Berne and the map committee may do something towards the removal of the existing confusion. The advantages of a map of the whole world on the same scale must be evident to all. One of the most striking is that the comparison of areas will be much simplified. An idea may also at once be

obtained of the extent of unexplored countries. Maps of Africa, for instance, are at present constructed on a smaller scale than 1 : 1,000,000, and are covered with a network of rivers and mountains; but when this continent is represented on a larger scale, the blank spaces will become more prominent, and, comparison with civilised countries being rendered possible, the real state of our knowledge of this continent will become apparent.

The Seventh International Congress of Hygiene and Demography.—There have been several Congresses this year, but probably none of greater importance, both numerically and scientifically, than the Demographic Congress held in London between August 10th and 17th, under the patronage of Her Majesty the Queen. The civilised nations of the world were represented by delegates, and the members of the Congress numbered nearly three thousand, foreigners being especially numerous.

To indicate the scope of the Congress, the various sections may be enumerated. *Division I. : Hygiene.*—Section I., Preventive Medicine ; Section II., Bacteriology ; Section III., The relation of the diseases of animals to those of man ; Section IV., Infancy, childhood, and school-life ; Section V., Chemistry and Physics in relation to Hygiene ; Section VI., Architecture in relation to Hygiene ; Section VII., Engineering in relation to Hygiene ; Section VIII., Naval and Military Hygiene ; Section IX., State Hygiene. *Division II. : Demography.*

H.R.H. the Prince of Wales presided over the inaugural meeting, and gave an admirable opening address. Many papers read at this Congress were of interest to geographers, although of course not exclusively dealing with geography in the limited sense of the term. It is only possible to call attention to a few :—The methods of preventing the spread of diseases from one country to another, by Surgeon-General J. M. Cuningham ; The communicability of cholera from one country to another, by Inspector General R. Lawson ; Diphtheria, with special reference to its distribution, etc., by E. C. Seaton, M.D. ; The influence of the Nile on mortality in Egypt, by Green Pasha ; The prevention of fever in India, by Surgeon-General Sir W. Moore ; Observations on malaria and enteric fever, etc. by R. W. Felkin, M.D. ; The geographical distribution, etc., of the *Filaria Sanguinis Hominis*, by Patrick Manson, M.D. ; Cholera in Egypt, by Dr. Sandwith ; The influenza and weather of London, by Sir Arthur Mitchell and Dr. A. Buchan ; Sanitation in India, by B. Latham ; The suitability of tropical Highlands for European settlement, by Surgeon-General Sir W. Moore ; On the same, by C. Markham, C.B. ; The effect of altitude on the suitability of tropical climates for the permanent residence of European races, by R. W. Felkin, M.D. ; The influence of clays and limestones on medical geography, etc., by Dr. A. Haviland.

The sections were well attended, and most of the papers gave rise to animated discussions. The entertainment of members was liberally provided for, and numerous conversazioni and garden-parties were given.

MISCELLANEOUS.

The Australasian Association for the Advancement of Science will meet at **Hobart**, Tasmania, on 7th January 1892.

A railway has just been opened, which runs from **Seraievo to Mostar**, and places the capital of Bosnia in communication with the Adriatic.—*Le Tour du Monde. Nouvelles Géogr.* p. 272.

An account of the history, manners, and customs of **Tibet**, derived from Chinese sources, is published in the *Journal of the Royal Asiatic Society*, January and April 1891. The author is Mr. W. W. Rockhill.

The Chinese have evidently decided to construct a **Railway to the Frontier of Manchuria**. The line from Tien-tsin to Kai-ping has been prolonged to Yung-ping, and work has been commenced at New-chang. Beyond that port the route runs through Mukden and Kirin.

At the beginning of July a **New Lake** sprang suddenly into existence at Salton, Yuma County, **Arizona**. Its length is 40 miles, and breadth 12 miles. It is generally believed that the water comes from the Gulf of California.—*Deutsche Rundschau*, Jahrg. xiii. No. 11.

The frontier dispute between **Colombia and Venezuela** has been decided by the King of Spain in favour of the former. The new boundary in the south-west of Venezuela will be formed by the rivers Arauca, Orinoco, Atabapo, and Negro. The peninsula of Goajira and the territory of San Faustino will also belong to Colombia.

The name of **Tasman Sea** for the sea between New Zealand and the islands to the north-west of New Zealand on the one hand, and Australia and Tasmania on the other, has been adopted by the Admiralty, and will be inserted on charts and other publications. The name was suggested by the Australasian Association for the Advancement of Science.—*The Times*, August 14th, 1891.

Mr. Theodore Bent is at present engaged in the exploration of the ruins at **Zimbabye**, Mashonaland, which are among the most unique in the World. The principal is a walled enclosure 260 yards in circumference, with walls 16 feet thick and 40 feet high in some places. A frieze representing a hunting scene and other sculptures have been found. The builders were, Mr. Bent is inclined to think, probably Phœnician Arabs.

A Swedish trader, Georg Valdau, has discovered to the west of the Elephant Lake, **Cameroons**, another lake not much smaller. It is about one and a quarter miles in diameter, and lies about 2300 feet above the sea-level. It is drained by the Mokunda, which flows into the Meme. Herr Valdau named it the Soden Lake, after the ex-Governor of Cameroons (now Governor of East Africa).—*Verhandl. der Gesell. für Erdkunde zu Berlin*, Bd. xviii. No. 6.

A company has been formed to make **Copenhagen a Free Port**. It is feared that the canal now in course of construction across Holstein, from the North Sea to the Baltic, may neutralise the advantages which Copenhagen has derived from its geographical position. By reducing to a minimum loading and discharging expenses and removing the trammels to trade unavoidably connected with the levying of dues, the promoters of the scheme hope to facilitate and develop such transit-trade as already exists in Copenhagen.—*The Times*, August 17th.

There seems now to be little doubt that, if **M. Crampel** himself has not been assassinated in Baghirmi, his expedition at least has been put to flight. The Administrator of Brazzaville gives April 9 as the date of the occurrence. Another French traveller also has been repulsed. **M. Fourneau** had advanced northwards to about the 7th parallel of north latitude, or about 140 miles to the north of the great bend of the Mobangi, when his party was attacked during the night. After losing some of his men, he was obliged to retreat on Brazzaville.—*Le Mouvement Géographique*, August 9, 1891.

NEW BOOKS.

De la Colonisation chez les Peuples Modernes. Par Paul Leroy-Beaulieu, Membre de l'Institut. Quatrième édition, revue, corrigée et augmentée. Paris : Guillaumin et Cie., 1891. Pp. 868.

The author of this volume and the volume itself are favourably known to students of political geography and economical science. This is a fourth edition of the book, but it has been so elaborately edited that it may be said to have been largely re-written. Such a work, by so competent a writer as M. Leroy-Beaulieu, is of the highest importance and value.

In the first part of the book the author passes under review, and examines in a natural order, the colonial policy of the principal peoples of Europe, from the discovery of America to the present time. The policies of Spain, Portugal, Holland, England, France, Russia, Denmark, and Sweden are traced in considerable detail, and contrasted one with another: the different systems are explained, and their modifications and developments pointed out. The author evinces, in a remarkable degree, the unusual capacity for criticising such a subject from a purely impersonal and academic standpoint. He does not hesitate to apportion blame wherever he finds it : *e.g.*, in his long review of French colonies, but especially Algeria and Tunis, he has some hard things to say of the administrative blunders of his own countrymen. He points to Great Britain as the most successful and most capable of colonial Powers—at least since the commencement of the present century. He draws the proper distinction between exploitation and plantation colonies, and shows how relatively few ideal colonies—those of settlement—have been founded by any other Power than Great Britain.

The second part of M. Leroy-Beaulieu's work is, in some respects, the most valuable, though dealing largely with economical subjects. From his examination of the respective merits in the colonial policy of European Powers, he deduces the general principles underlying successful colonisation. The first question he asks is, "Is it good for a nation to have colonies?" Does the possession of colonies argue a true element of development and prosperity, or, on the contrary, does it enfeeble the State by losing her children, and impoverish her by dispersing her capital? His arguments are all in favour of colonisation, but colonisation based upon the true principles of economical science, which he explains from the point of view of the metropolis and from that of the Colonies themselves.

Livingstone, and the Exploration of Central Africa. By H. H. Johnston, C.B. "Explorers Series." London: George Philip and Sons, 1891. Pp. 367. *Price* 4*s.* 6*d.*

Probably no writer more competent than Mr. Johnston could have been selected for the task of reviewing Dr. Livingstone's work as an explorer. It was Dr. Livingstone, the premier missionary and pioneer-explorer, who "threw open the door" of British Central Africa, the political consolidation of which has in a large measure now fallen into Mr. Johnston's hands as British Commissioner. Yet the perusal of this volume is, we frankly admit, somewhat disappointing. There is too little of Livingstone and too much of the personality of Mr. Johnston in the pages of the book : in other words, the author is carried away by his knowledge of and enthusiasm for certain aspects of his subject, and neglects to consider its true bearings. Lack of balance is the chief fault of the book. Instead of giving the reader a well-balanced picture of the physical and political geography of Central

Africa, which should have served simply as a background to Livingstone's own work, instead also of drawing useful comparisons, Mr. Johnston enters into far too close detail concerning the *fauna* and *flora* of regions known to himself, whilst he devotes an undue amount of space to matters which are only incidentally associated with his subject. Possibly pressure of other work prevented the author from giving sufficient time to the elaboration of a more generalised view, and has tempted him into familiar by-paths. The most satisfactory portion of the whole book is that dealing with the Zambezi expeditions and the Last Journey. Himself familiar with a large part of the country under discussion, and for some years past having been associated with its development, Mr. Johnston handles his theme in a very satisfactory manner. It is noticeable that he maintains Livingstone's priority of discovery not only of Bangweolo and Moëro—which is commonly admitted—but also of Lake Nyasa; and he gives Portuguese officials their full mead of praise whenever he can conscientiously do so.

Whilst the picture of Livingstone as an explorer has been fairly satisfactorily portrayed by the author of this volume, he fails altogether, we think, in appreciating Livingstone the missionary-pioneer. And, after all, it is chiefly in the latter respect that Livingstone's name is honoured by the general public. Such a theme, in spite of what has already been written on it, might have inspired the pen of any man who, like Mr. Johnston, has seen for himself the practical results of Livingstone's life-work.

The volume, like the rest of the series, is well produced. There are twenty-two illustrations from photographs or drawings by the accomplished author, and seven maps by Mr. E. G. Ravenstein.

The Arab and the African. By S. Tristram Pruen, M.D., F.R.G.S. With Illustrations. London: Seeley and Co, 1891. Pp. 338. *Price* 6*s.*

This is a capital book. It is a popular and well-written description of the every-day life of the natives of Eastern Equatorial Africa, combined with the author's reflections on such subjects as the slave-trade, missionary enterprise, climatic diseases, etc. Dr. Pruen, who has spent three years in Africa, is a competent critic. His book is based almost exclusively on personal observation, which in a few places have led him into errors of a purely technical character; but, on the whole, his remarks are trustworthy. What specially distinguishes this book is the sound common-sense displayed by the author. Besides giving a very vivid picture of life in Tropical Africa, he offers very practical and serviceable advice to all those whose lot is cast in Africa. His book may be warmly recommended to missionaries, traders, and travellers who set out for Africa for the first time.

Zambezia. By E. P. Mathers, F.G.S., F.R.G.S. London: King, Sell, and Railton, Limited, 1891. Pp. 480. *Price* 7*s.*

We have already noticed this publication under its more modest dress as a supplement to *South Africa*. In its present form it will undoubtedly prove serviceable to those who are interested in South Africa. For the most part it is composed of extracts from all sources of information. There is a good map by Stanford, showing political boundaries, up to date.

Handbook to South Africa. Fourth edition, revised and enlarged. London: S. W. Silver and Co., 1891. Pp. 793. *Price* 7*s.* 6*d.*

So great has been the progress, so rapid the expansion, of commercial and colonial undertakings in South Africa since the last edition of this work appeared,

in 1880, that it has been found necessary to considerably enlarge it. Silver's *Handbook* is now a volume of nearly eight hundred pages. It contains a vast amount of information, carefully compiled, which is of the utmost value to the colonist, and may be read with profit by others. We have very complete accounts of Cape Colony, Natal, Basutoland, Bechuanaland, Zambesia, Zululand, Swazieland, Tongoland, the Orange Free State and the Transvaal, as well as of Portuguese East Africa and German S.-W. Africa. The section on the "Physical Geography" of South Africa, though not quite scientifically accurate in places, and somewhat confused in arrangement, has the merit of being comprehensive and serviceable; a judicious editor might make it even valuable. Other chapters follow on Climatology and Native races, and there is a useful gazetteer, map, and index.

The Melanesians: Studies in their Anthropology and Folk-lore. By R. H. Codrington, D.D. With Map and Illustrations. Oxford: Clarendon Press, 1891. 8vo, 420 pp.

Since the recent death of Dr. Inglis, one of our Fellows, we have no greater authority on the peoples of the Western Pacific, in the four groups of islands known as Melanesia, than Dr. Codrington. For nearly a quarter of a century he was a hard-working member of the Melanesian Mission of Bishop Selwyn, the headquarters of which is at Norfolk Island. His admirable lecture to our Society a few years ago enriches the pages of our *Magazine*. In the present elaborate and valuable volume we have the accurate details of the scientific generalisations and geographical descriptions of that paper. He has gone through the subjects treated in this volume with native instructors from the Solomon Islands, the Banks' Islands, and the northern New Hebrides. He sets forth as much as possible what natives say of themselves—not what Europeans say about them—on such ethnographic questions as these: Exogamous classes with succession through the mother; marriage; tokens; social regulations; property and inheritance; secret societies and mysteries; societies and clubs; religion; sacrifices; prayers; spirits; sacred places and things; magic; possession and ghosts; birth, childhood, and marriage at present; death, burial, and after death; arts of life; dances, music, and games; cannibalism and allied customs; stories. To such subjects the nineteen chapters of this most exhaustive book are devoted. It is *the* authority for these islands at least, and we trust it will stimulate missionaries in the other Pacific groups to imitate Dr. Inglis and Dr. Codrington. The map is an outline; it might have been more detailed.

Two Years among the Savages of New Guinea. By W. D. Pitcairn, F.R.G.S. London: Ward and Downey, 1891. Pp. 286. *Price* 5*s.*

Mr. Pitcairn sailed in 1887 from Cooktown in North Queensland to Samarai in New Guinea, and from thence proceeded in a small lugger to various islands off the coast. Returning to Samarai and the lovely China Straits, he next sailed to Sud-Est, a large island 40 miles in length and 8 miles broad, to prospect for gold; but neither there nor at the island of Rossel was he successful, although he considers that "within the coming two years gold will be found in New Guinea proper and in large quantities" if the search is made by a fully-equipped party. Mr. Pitcairn next visited the Bismarck Archipelago, and whilst *en route* at Woodlark Island their vessel received a most curious visitor in Tokiakus the Dwarf. "In all my travels," writes Mr. Pitcairn, "I had never beheld such a curiosity. Let me endeavour to describe him. Imagine a man 3 feet 6 inches in

height, of a chocolate colour, 35 years of age, having a Herculean chest, with arms the length of a child's. An immense head, covered with a shock of hair falling on his neck in ringlets, a flat nose, and a mouth stretching from ear to ear. Add to all a light summer suit consisting of a palm leaf round his loins, and the picture is complete." Tokiakus afterwards accompanied our author to New Britain as ship-boy.

The Germans have rechristened New Britain "Neu Pommern," New Ireland "Neu Mecklenburg," and Duke of York Island "Neu Lauenburg." Mr. Pitcairn landed on the last-named island, and inspected the plantation there of the Hamburg Plantation Company. Everything was of a substantial character, and in 1887 the profits of this one plantation were £1300. Copra (made from coco-nuts) is the principal industry carried on, though coffee is grown to some extent. After an exciting friendly race with a German cutter, the author's vessel reached New Britain; and there he saw a splendid plantation, the property of a lady, a most accomplished half-caste Samoan, who was the widow of an American. The scenery was magnificent, but the terrible earthquakes which had occurred in the vicinity depreciated the value of the district. Count Pfeil, the German Government officer there, censured the author for landing in Neu Pommern without first reporting himself to the Government authorities, and actually fined him £1, "that being the lowest amount he could inflict for our evasion of the German regulations." We can commend this book for its interesting account of a voyage in almost untravelled regions, which may yet become commercially valuable and important. "Unlike Australia," says Mr. Pitcairn, "New Guinea is never subject to periodic droughts, and when it becomes better known, British capital will be introduced. Industries will spring up, and the country will eventually be developed and become the home of many of our fellow-countrymen."

A Description of the Shetland Islands, comprising an Account of their Scenery, Antiquities, and Superstitions. By SAMUEL HIBBERT, M.D., F.R.S.E., etc. Lerwick: T. and J. Manson, 1891. Pp. x + 294.

Hibbert's monumental work on the Shetland Islands is so well known as the standard work of reference for many questions connected with *Ultima Thule*, that any particular discussion of its contents is here unnecessary, and we may, accordingly, confine our remarks to the form and substance of this new edition. In the first place, it will be observed that the author's extensive notes on the geology of the islands are not included, nor is their absence very much to be regretted, for, although Dr. Hibbert was a keen and accurate observer and investigator, yet the science of geology has advanced so fast and so far since 1822, when the first edition was produced by the Constables, that they are now consulted more out of curiosity than for information. The very valuable chapter on the Udallers has been retained, and will be found, taking it all in all, to be one of the best and clearest expositions extant of the peculiar land tenures of the Shetlands,—tenures which first came into use with the building of St. Magnus Cathedral at Kirkwall by Jarl Rognvald, for which, and other good works, he was afterwards canonised. All the interesting matter treating of the scenery, antiquities, the people with their dress and quaint, Norse, old-world manners, customs, and language are given in full, with particulars of certain cases of witchcraft—not, by any means, the least instructive part of the work. The ministers of Orkney and Shetland were, at one time, celebrated above most others for their activity and for their relentless pursuit of old women suspected of a knowledge of the black art. The references to this subject present us with a picture of credulity, superstition, and cruelty as dark and sad as it is strange and engrossing.

Some of the original illustrations have been reproduced, but as they were not successful works of art in the first edition, neither do they come out well here. The positions occupied by the notes, too, are not well chosen, as they will naturally be looked for at the end of the volume, and not at the conclusion of each *iter*. But such faults are trifles, and need not be insisted upon at length. A word of high praise must be given to the publisher for the beauty of the whole volume, whether as regards the good type, tinted paper, wide margins, numerous fly-leaves, guiltless of advertisements—something to be thankful for, surely—or the rich, sober binding. The book, not only in contents, but in general appearance, will be a valuable acquisition to any library.

Murray's Handbook to Durham and Northumberland. London : John Murray, 1890. Third edition.

This excellent *Handbook* has been carefully revised, and contains information supplied by many eminent authorities. Thus, Canon Greenwell contributes much regarding Durham Cathedral and other ancient churches ; Sir W. Crossman, M.P., writes the account of Holy Island, of which he is the proprietor ; and the description of Auckland Castle and neighbourhood is partly the work of the late Bishop Lightfoot. Maps of Northumberland and Durham, showing their Parliamentary divisions, are given. We should have desired to see either in these or other maps the orographical features of the counties more clearly indicated, and perhaps in a future edition this might be done, as the counties described lend themselves particularly to orographic mapping.

A Summer in Kieff; or, Sunny Days in Southern Russia. By Isabel Morris. Pp. 205. Illustrated. London : Ward and Downey, n.d. *Price* 10*s.* 6*d.*

The searcher after fresh geographical information may at first be inclined to condemn Miss Morris's narrative as a feminine imitation of such humorous tales as those of Mr. Jerome. This would, however, be but a first impression, we think, as, the journey to Kieff safely accomplished, we are treated to a most interesting account of daily life in Little Russia during the hot season. No doubt the authoress's lively temperament and keen sense of the ludicrous cause her to introduce scenes which may seem irrelevant in the eyes of the scientist, but even these descriptions generally serve to show up native peculiarities, which are many and various. Miss Morris has something to say (pp. 163-4) on the subject of the Russian Jews, a question of present interest, and her remarks are worthy the attention of over-zealous philanthropists. It seems a pity that so careful an observer had no opportunity of visiting other parts of Russia, beyond the neighbourhood of Kieff, as it would have given additional value to her pleasing and instructive record. The book is handsomely got up and clearly printed ; the illustrations are after the style of the humorous works already referred to.

Armenia, the Armenians, and the Treaties. By M. G. Rolin-Jaequemyns, President of the Belgian Institute of International Law. London : John Heywood, 1891. Pp. xvii. + 104.

This treatise and its anonymous preface furnish interesting details regarding an unfortunate and much-persecuted race. The Armenians are a Christian people, who still retain their vitality, although for five centuries they have been subject to the Ottoman yoke. They have overflowed their territorial borders and are

found not merely in every part of Turkey but also in the chief commercial cities of Europe. Two-thirds of the nation, or 780,000 souls, still live in Turkish Armenia, and these seem to be in a peculiarly helpless and unprotected condition, a prey to Kurds, Circassians, and Turks.

Diccionario Geográfico de la República de Bolivia. Tomo Primero: Departmento de La Paz. Por Manuel V. Ballivian y Eduardo Idiaquez. La Paz: Isaac V. Vila. Pp. xvi. + 164.

This is the first part of a projected gazetteer of Bolivia, and embraces all the section dealing with the department of La Paz. Of course, a good deal of the department is little known, but considerable pains have been taken, and the notices extend even to outlying haciendas. More attention, however, should be paid to the relative proportion of the several articles; the account of the department as a whole occupies 15 pages, while the capital has only a quarter of a page, and that tells nothing of the present city but its position, and that it is a bishop's see, and has a temperate climate; it is not much of a place, but it deserves better than this at any rate. A map is promised, and the work, if completed, ought to prove serviceable.

Beiträge zur Geologie von Galizien. By Dr. Emil Tietze. Vienna, 1889-91.

We have before us the fourth and fifth parts of a series of papers on the geology of Galicia, which have been appearing from time to time in the pages of the *Jahrbuch der k.k. geolog. Reichsanstalt.* The papers are devoted chiefly to questions relating to the geological structure of the regions traversed by Dr. Tietze —regions which are noted for their great salt-formation. The mineral wells and salt springs naturally come in for some notice; but the author's papers are largely occupied by discussions which are intelligible only to specialists, who will find much to interest and instruct them in Dr. Tietze's pages. We may mention that some account is given of those remarkable exotic blocks (erratics) which, occurring as they do in the Tertiary Carpathian Sandstones, have been a sore puzzle to geologists to account for.

NEW MAPS.

EUROPE.

CENTRAL EUROPE, Touring Map of——. By J. G. Bartholomew. Scale, 1:2,000,000, or 31·5 miles to 1 inch. Bartholomew's World Series of Travelling Maps. *John Bartholomew and Co., The Edinburgh Geographical Institute, Park Road, Edinburgh.*

EDINBURGH, Plan of——, with Leith and Suburbs. Reduced from the Ordnance Survey and revised to the present date. By John Bartholomew, F.R.G.S. Scale, 15 inches to a mile.

John Bartholomew and Co., The Edinburgh Geographical Institute, 1891.

Messrs. Bartholomew and Co. deserve the highest commendation for their enterprise in bringing out this handsome Plan of Edinburgh, and for the technical skill with which it has been produced. The sheets are beautifully printed and coloured. The Plan consists of 12 sheets, the work on each measuring 18½ inches square, which, with the extension to the west, make the complete map 6 ft. 4 in. deep by 5 ft. 2 in. broad. The basis of the Plan is the recent Ordnance Survey of

the city, on the scale of 5 ft. to a mile, consisting of no less than 56 large sheets. These have been reduced to the 12 sheets of the present Plan, on a scale of 15 in. to a mile, with such care and precision that no important detail contained in the large sheets has been sacrificed. The sheets have, moreover, been brought up to date by special surveyors, whose work has afterwards been revised by competent authorities. In atlas-form the Plan has a very attractive appearance ; but we think its value would have been greatly enhanced by the addition of an index to the sheets.

ISLAND, Die Vulcane im nordöstlichen ——. Von Th. Thoroddsen. Massstab, 1 : 800,000. *Mitteilungen der K. K. Geographischen Gesellschaft in Wien. Band* xxxiv., *Tafel* 6. *Wien : R. Lechner's K. K. Hof-Buchhandlung.*

MAR JONIO, Carta Batometrica del——, cogli Scandagli a grandi profondita eseguiti dalla Regia Marina. Disegnata del Guido Cora. Scala media, 1 : 2,100,000. *Cosmos*, vol. x., 1890-91, *Tavola* v.

MASURISCHEN SEEN, Die grossen——. Nach der preussichen Generalstabskarte, reducirt. Von G. Freytag. Massstab, 1 : 200,000. *Deutsche Rundschau für Geographie und Statistik*, xiii. *Jahrgang, Heft* 10. *Wien : A. Hartleben's Verlag.*

MORAVIA, Das Höhlengebiet bei Brünn. Gezeichnet von Professor R. Trampler. *Deutsche Rundschau für Geographie und Statistik*, xiii. *Jahrgang Heft* 11. *Wien : A. Hartleben's Verlag.*

SCOTLAND, The Tourist's Map of——. By John Bartholomew, F.R.G.S. Showing the new County Boundaries so far as settled by the Boundary Commission. Scale, 1 : 633,600, or 10 miles to 1 inch. *John Bartholomew and Co., The Edinburgh Geographical Institute, Park Road, Edinburgh.*

SCOTLAND, Bartholomew's Reduced Ordnance Survey of——. Sheet 7—Glasgow and Clyde ; Sheet 11—Oban District ; Sheet 12—Central Perthshire. Scale 1 : 126,720. *John Bartholomew and Co., The Edinburgh Geographical Institute, Park Road, Edinburgh.*

ZANTE, Originalkarte der Insel ——. Auf Grund der Englischen Seekarte und der Beobachtungen des Prof. J. Partsch entworfen und gezeichnet von Dr. Karl Peucker. Massstab, 1 : 100,000. *Petermann's Geographische Mitteilungen, Jahrgang* 1891, *Tafel* 12. *Gotha : Justus Perthes.*

ASIA.

KWEN-LUN, Uebersicht des ——. Von Dr. Georg Wegener. Massstab, 1 : 7,500,000. *Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Band* xxvi., *Tafel.* 5-6. *Berlin : W. H. Kühl.*

MINDANAO, Karte des östlichen ——. Auf Grundlags der Karte von Montana-Hausen und der orohydrographischen Karte der Philippinischen Jesuitenmission. Von. Prof. Blumentritt. Massstab, 1 : 650,000. *Mitteilungen der K. K. Geographischen Gesellschaft in Wien. Band* xxxiv., *Tafel* 9.

AFRICA.

AFRICA, Die flächentreue Kegelprojection für die Karte von——. Von Dr. Alois Bludau. Massstab, 1 : 90,000,000.
Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Band xxvi., *Tafel* 3. *Berlin : W. H. Kühl.*

DEUTSCH OST-AFKIKA, Kettler's Schulwandkarte von——
Weimar : Geographisches Institut.

EAST-AFRICA, Dr. W. Junker's Rückreise vom Victoria Njansa über Tabora nach Bagamojo August bis November 1886. Nach dem Tagebuch im Massstab von 1 : 185,000, construirt und auf den Massstab, 1 : 750,000 gezeichnet von Dr. B. Hassenstein. *Petermann's Geographische Mitteilungen, Jahrgang* 1891, *Tafel* 13. *Gotha : Justus Perthes.*

EASTERN EQUATORIAL AFRICA, to illustrate Dr. H. Schlichter's Paper, A.D. 150, A.D. 1890. Scale, 1 : 12,672,000.
Proceedings of the Royal Geographical Society, Sept. 1891.

MAROCCO-NORD, Carta di una parte interna del——, secondo le esplorazioni di Tissot, de Foucauld, di Boccard, des Portes e.a. costrutta di disegnata da Guido Cora. Scala, 1 : 300,000. *Cosmos*, vol. x., 1890-91, *Tavola* vi.

TADEMAYT, Mission au——. Itinéraire de F. Foureau. Echelle, 1 : 1,000,000.
Bulletin de la Société de Géographie, Paris, 1891. 1^er^ *Trimestre.*

THE KEBBI RIVER, from its junction with the Benue to the Bifara Marshes. Reduced from a drawing by Capt. A. E. Mockler Ferryman. Scale, 1 : 253,440.
Proceedings of the Royal Geographical Society, August 1891.

NORTH AMERICA.

THE SELKIRK RANGE, Part of——, British Columbia, to illustrate the climbing done in 1890 from Glacier House. From Surveys and Photography by Messrs. Emil Huber and Harold W. Topham. Scale, 1 : 126,720.
Proceedings of the Royal Geographical Society, Sept. 1891.

SOUTH AMERICA.

BRAZIL, Itinerar des Weges von Cuyaba über Goyaz nach Leopoldina am Araguay, vom Mai bis August 1888. Von Dr. Paul Ehrenreich. Massstab, 1 : 1,000,000. *Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Band* xxvi., *Tafel* 4. *Berlin : W. H. Kühl.*

RIO GRANDE DO SUL, Geologische Uebersichtskarte, Uebersichtskarte der Pflanzendecke, Besiedelung und Verkehrswege, Uebersichtskarte der Bevölkerung. Von Dr. A. Hettner. Massstab, 1 : 7,500,000.
Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Band xxvi., *Tafel* 2. *Berlin : W. H. Kühl.*

NORTH POLAR REGIONS.

NORTH POLE, Die Arktische Windscheide und die neusten Polarprojekte. Von A. Supan. Massstab, 1 : 30,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 14.
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NORTH POLE, Polarkarte zur Uebersicht der früheren und heutigen Menschengrenze. Entworfen von Kurt Hassert. Massstab, 1 : 30,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1891, *Tafel* 11.
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ATLANTIC OCEAN.

SARGASSO SEE, Die Nordatlantische ——. Nach der Häufigkeit des Krautvorkommens dargestellt von Prof. Dr. O. Krümmel. Massstab, 1 : 31,300,000.
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CAROLINE ISLANDS, Chrabrol Harbour (Ualan Island).
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KOREA, South Coast, Crighton Group—Paön do Monocacy Anchorage.
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Hydrographic Office, Navy Department, U.S.A., Richardson Clover.

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HISTOIRE ET GÉOGRAPHIE, Atlas Vidal-Lablache, Maître de Conférences de Géographie à l'école normale supérieure. 24 Livraisons, 137 Cartes, 248 Cartons. ix. Livraison. *Paris : Armand Collin et Cie., Éditeurs.*

SCHWEIZ, Topographischer Atlas der ——, im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg. topogr. Bureau gemäss den Directionen von Oberst Siegfried veröffentlicht.

Lieferung XXXVIII. :—

No. 265, Schilobach.	No. 294, Donneloye.	No. 437, Morges.
„ 266, Spitzmeilen.	„ 384, Marbach.	„ 439, Savigny.
„ 270bis, Seezthal.	„ 385bis, Schangnau.	„ 456, Chardonne.
„ 287, Yvonand.	„ 421, Tarasp.	„ 467, Villeneuve.

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THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

BRITANNIC CONFEDERATION.

V.—ON ALTERNATIVE MEASURES.

By Maurice H. Hervey,

Principal of the Illawarra College, New South Wales.

The word "alternative" presumes a choice between two possible courses, and with communities, as with individuals, such choice is often perplexing. Above all is it essential that the consequences certainly, or probably, destined to ensue from the selection of one or other alternative be clearly set forth and understood. And, as a necessary preliminary, the alternatives themselves must be exactly defined. Now, *quoad* Britannic Confederation, this preliminary cannot be said to have been overcome, inasmuch as no definite plan of federation has, as yet, been successfully advanced. Where doctors disagree, who shall decide? It is easy to preach the doctrine of Federation. It is not difficult to foreshadow the prospective advantages of race-union and the prospective evils of race-disintegration; and this, indeed, is primarily the object of this paper. But of what use proposing alternatives, one of which has not been shown to be possible of adoption?

This is unquestionably the reason why the entire question has so long hung fire. Perhaps no question of modern times has more generally engaged the attention of politicians than the abstract idea of drawing together more closely the ill-defined, relaxed bonds of British race-unity. Our ablest writers have discussed it, our best orators have waxed eloquent over it, an influential League has for years advocated it, and striven to keep it prominently before the public mind. And yet the great cause has made but little real progress. Neither the home nor the colonial public has, in expressive modern *argot*, "caught on." Federation is as

little generally understood as bi-metallism or the zone freight system. And this, mainly, because no one knows exactly what it exactly means, or how it can possibly be brought about. Thus, whilst separation from the mother-country, as one alternative, is an eventuality realised as possible by all the colonies, definite federal union with her, as the other alternative, has hitherto never assumed a tangible shape capable of serious discussion.

From a study of the papers upon Britannic Confederation which have already appeared in this Magazine, it appears that two of the four distinguished contributors regard some form of commercial union as an essential preliminary; one prefers that the initial steps should take the form of defence; whilst the fourth rejects the federal idea *in toto* as wholly inconsistent with the dignity of Great Britain. Each one of these proposed ways of viewing the question has a strong following, the commercial-union plan being, for the moment, perhaps, most in favour. Moreover, the publications of the Imperial Federation League reveal the existence of yet another class of thinkers, who advocate political union without more ado; whilst in the background lie the great mass of the British communities placidly indifferent to the whole affair, quite content to "leave well alone," satisfied to leave the decision to Providence and time.

Now, Providence, as we know, helps those who help themselves. Time is usually a mere witness to the succession of effect upon cause. And the "leave well alone" platform is untenable because, in the first place, things at present are very far from being well; and, secondly, because they give every promise of becoming far worse in the near future.

Yet, how bring these facts home to the popular mind? Probably those only who have been in the habit of addressing mixed audiences can rightly appreciate the general ignorance rife in one British community as to the condition and prospects of other British communities. And nowhere is this more noticeable than in Great Britain. Such audiences love to be told that they have a vested interest in the largest and wealthiest empire of which history furnishes any record; and with maps, diagrams, and clear explanations, it is not difficult to make this clear to all. Upon this ground it is easy to evoke enthusiasm. But when a speaker proceeds to describe how this vast heritage has been gained only at the cost of enormous sacrifices and of ceaseless effort, and that it can only be kept upon the same terms, the enthusiasm dies out. That "property has its duties as well as its rights" is a trite popular saying upon which much modern legislation has been based; but, when the Imperial interests are concerned, it is the hardest of all axioms to drive home. And yet, not until it shall have been driven thoroughly well home, can any strong expression of the national will be looked for. No great movement ever yet came to a successful issue which was not supported by the people. Politicians and philosophers may instruct, admonish, but they must in the end move with the irresistible current of public opinion. So, too, it is easier to convert, to convince a hundred well-informed, thinking men than one uncultured artisan; but unless the artisan be convinced, the conversion of the hundred goes but a very little way. It is not sufficient to make it clear to readers of high-class magazines that prompt, definite

action is necessary to save the Empire from impending disintegration, and that such disintegration would be an irretrievable national calamity. The realities of the situation, the prospects and the perils which confront further national progress, must be disseminated throughout every land peopled by men of British race, by every available channel of popular instruction, and, notably, by the popular press. Hitherto this press has moved but sluggishly in the matter, alleging (and, it must be confessed, not without good show of plausibility) that, until the leading prophets of federation shall have agreed amongst themselves as to the lines upon which race-unity should be maintained, no programme can be submitted for national approval or rejection. But this is, in reality, rather an excuse than a reason for shelving the question. The prophets are at least agreed in advocating the necessity for federation. That they are not also agreed as to ways and means of bringing it about is mainly owing to the extreme difficulty of estimating what methods would most commend themselves to the bulk of English-speaking communities. It is to be noticed that the question, albeit the most mighty in prospective results ever submitted to a nation, is not one which tangibly affects the conditions of daily life. The least intelligent members of a community can appreciate the importance of the cheap loaf, of reduced taxation, or of extension of the franchise; and, upon such questions, the popular voice is wont to speak promptly and emphatically enough. But of the British Empire, its history, its value, its prospects, nine-tenths of the race to which it belongs know extremely little and care less. This indifference (which posterity will so harshly stigmatise) springs from no want of patriotism, of which an ample supply lurks in most British hearts, but from sheer downright ignorance of the issues at stake. And this, the most insuperable of all stumbling-blocks upon the steep path to national unity, the press is, by far, the most potent agency to remove. I, for one, would rather see but a single one of the widely-circulated London "dailies" advocating the good cause with a will than learn that a hundred new branches of the Federation League had sprung into existence. If it be asked *how* the slumbering lion of public opinion is to be aroused, upon what lines the nation is to be convinced of the necessity for definite action, then the reply would appear to lie in the clear establishment of two single propositions:—

I.—The loosely-connected component elements of what is at present vaguely known as the British Empire cannot hold together very much longer under existing conditions; that is, the only alternative to some form of closer union, or federation, is disintegration.

II.—Federation would be to the advantage of all British communities, individually and collectively. The alternative, disintegration, would, on the contrary, obviously at once destroy their collective interests, and would not only injure the individual interests, but would, in the case of many communities, jeopardise their very existence.

Of these two propositions, the first appeals with equal force to Great Britain and to the Colonies; the second must be viewed from two standpoints: that of the Englishman living in Great Britain, and that of the Englishman living in one or other of the Colonies.

I.—Federation or Disintegration?

When, more than three centuries ago, England first fairly awoke to to the pangs of earth-hunger, she came very late into the field. Spain, Portugal, Holland, and France had all secured a considerable start in the race for empire. But, thanks to her insular position, her gradually established superiority at sea, the generally judicious part she was enabled to take in the successive struggles between Continental nations, and the commercial basis upon which she strengthened her steady advance, she finally emerged with more foreign possessions than she well knew what to do with. Not more than she wanted, be it well understood; because the colonising propensities of Englishmen are apparently insatiable; but certainly more than she could reasonably expect to keep for an indefinite period upon an indefinite plan. As regards India and her other alien-peopled possessions, her policy has, indeed, been clear and consistent. They were and are conquests, which must be kept by the power of the sword. But in dealing with the vast territories colonised by communities of British blood, Great Britain's course has been lamentably erratic, equally generous and inconsistent. Whilst bestowing upon mere handfuls of settlers enormous areas of land and ample legislative freedom, thereby engendering the idea of future independent nationality, she has retained in her own hands paramount powers which are, to the colonial mind, irritatingly suggestive of colonial inferiority. Complacently recognising the probability that, by and by, these communities would sigh for complete independence, she has throughout acted as though they would for ever remain tied to her apron-strings. Potential nationalities, even though youthful, should early be taught to rely mainly upon themselves; but the colonies have, throughout, been permitted—nay, encouraged, to rely wholly upon the mother-country. They have been treated like spoilt children, and they have sighed for manhood, also, like spoilt children, without realising what the responsibilities of manhood entail. To maintain imperial fleets and armies, people in the United Kingdom have for years been groaning under a taxation which, owing to the harder conditions of life here, they could ill afford to pay; whilst the Colonials, who, owing to the easier conditions of life abroad, could afford to pay their share very well, have (until recently, and then but to a trivial amount) escaped scot-free. So long, indeed, did they enjoy this immunity, that they now view any proposals to tax them, *for their own defence*, as a hardship scarcely to be borne. Had Britain, before signing away her territories with so lavish a hand, insisted upon a fair distribution of the revenue necessary for imperial purposes over the whole Empire, this unfair protest would never have arisen; for true it is that "an old tax is no tax." Colonials now evince no gratitude for past favours; they stare steadily at the future; and their platform is practically this: "If, in the past, Great Britain has protected us, and lent us money, and built us up generally, she doubtless had her own reasons for doing so, and made a good profit out of the transaction. Our great danger from attack at present (whatever it may have been formerly) lies in some outcome of her foreign policy, in which we are not consulted. If

we are to protect ourselves—which is the real meaning of paying for our own protection—we must either have a voice in this perilous foreign policy, or cut the imperial connection, and start a less hazardous foreign policy of our own." And upon the just principle that "they who contribute shall spend," it will be conceded that there is much of force in the colonial contention. It is, at all events, clear that the present dead-lock cannot endure.

But even upon the not very warrantable assumption that Great Britain, rather than provoke a breach with the Colonies, should waive the question of defence-contributions and continue to bear the burthen alone, the further question arises: Could she maintain the Empire, in its present dislocated condition, for any measurable length of time? Sharp and swift comes the answer: No. It is useless blinking our eyes to the fact that, with perhaps a single exception, Great Britain is regarded with jealousy or dislike, or both, by the Great Powers of Europe. Yet she must play her part in every fluctuation of the balance of power.

Does the most patriotic of Jingoes seriously believe that in the event of war, and with a great maritime nation against her, Great Britain could afford protection (with her existing armaments) to her foreign possessions? Or that, if her own shores were in danger, she could leave squadrons in the Atlantic or the Pacific? And what could unprotected possessions do, save shelter themselves beneath the neutral flag of independence? Surely the position needs but small argument, beyond a bare glance at the perils which lie ahead. And, equally surely, if Britain and the Colonies neglect to set the imperial house in order, jointly, and whilst yet there is time, they can look for no other result than that it should fall in ruins about their ears.

There are not wanting those who, in the face of the constantly increasing armaments of Europe, profess a firm conviction that the very magnitude of these warlike preparations will effectually glue the sword to the scabbard until, by common consent, a general disarmament takes place. They point to the fact that, with modern weapons, the struggle would necessarily be so unprecedentedly bloody, that no government will face the responsibility of throwing down the glove. History, neither past nor modern, would seem to justify such sanguine views. But even if we admit, for the sake of argument, that there will be no European war, or that, if there be one, Britain will contrive to steer clear of it, the only difference which this hypothesis can make, so far as imperial prospects are concerned, is that, in lieu of rapid disintegration consequent upon war, there would supervene more gradual disintegration consequent upon diversity of interests. The great Colonies are now well past the leading-string stage. They possess all the elements necessary towards forming distinct nationality; and each day their position, as merely dependent factors in the sum-total of Britain's greatness, becomes more irksome to them. They are powerless to make a commercial treaty with even sister-colonies without admitting to its provisions Britain's foreign customers. They cannot even communicate with a foreign nation, except through the British Foreign Office. They labour under all the vexatious disadvantages of vassalage, and they resent it. Canada is,

indeed, handicapped by the proximity of the United States, and fears absorption into the giant republic, did she part company with Britain. But Australia is not so handicapped, nor is South Africa; and the steps already taken by the former towards the establishment of a "Commonwealth" (the mere name of which is inconsistent with a monarchical form of government) plainly shows that Australian patience is rapidly approaching the vanishing-point. And the loss of Australia, besides meaning the loss of more than one-third of the whole territory in the Empire, would be a striking precedent for others to follow. The Australian colonies cannot fairly be blamed or accused of want of patriotism in the steps they have taken and purpose to continue. They have waited a long time for some sign from the mother-country. When the Imperial Federation League came into recognised existence, the Colonies had already held preliminary federal meetings at Hobart Town. These, failing the concurrence of New South Wales, fell through, or, more correctly, were postponed. But, finding that imperial federation fell flat in England, they revived the idea of federating *inter se*, and even New South Wales this time took part in the proceedings. Of course, all British Colonies realise full well that their position would be far higher as States of a Britannic Confederation than as embryo republics. But failing any authoritative invitation to join such a confederation, they are preparing for the day of British disintegration. Such, at least, is the conviction which a residence of twelve years in the various Colonies has forced upon the mind of the writer.

Finally, as to the question whether even loss of the Colonies would be equivalent to loss of empire to Great Britain, I can only say that, in my judgment, it would. An empire, of a sort, she could still have, so long as she could keep a hostile Power out of India, and maintain her rule over her Asiatic subjects at odds of four thousand to one. "If this be empire, make the most of it,"—but it is not the sort of empire foreshadowed by a Britannic Confederation.

II.—The Profit and Loss of the Alternatives.

This section of the subject may conveniently be resolved into (broadly) two sub-sections: Financial-Commercial and Political. And, moreover, as the considerations involved are not quite identical, so far as native-born and colonial-born Britons are respectively concerned, it would appear advisable to rehearse them separately.

(i.) Financial-Commercial Considerations (*as viewed from Great Britain*).

Most business men, if confronted with the alternatives of continuing a business, or carrying it on, would pause to consider the amount of capital sunk in that business. Englishmen are nothing if not business men. It therefore behoves them, as a preliminary, to total-up the amount already invested in their Empire. What the total *might* be stated at, from first to last, it simply staggers the imagination to conceive. But here are a few items which, as it were, lie upon the surface.

To, say, 100 years' expenses incurred for defence of the said Empire at the (very moderate) rate of £25,000,000 per annum, ...	£2,500,000,000
To extraordinary war expenses (Crimean and petty wars, etc.), . . .	350,000,000
National Debt (1815), . . .	850,000,000
Interest paid on National Debt since 1815,	2,040,000,000
	£5,740,000,000

Five thousand seven hundred and forty millions sterling! One has to think the figures over for a few minutes to get an idea of what they really mean. Yet a few minutes' more reflection will show they are by no means an exhaustive statement of the sums actually spent and paid for. Yet stay! the odd £740,000,000 has not yet been paid for. It is, in fact, still owing, and is commonly known as the National Debt. By whom owing? Nominally by Great Britain. But is it conceivable that a Britannic Confederation, once organised, would consent to saddle the mother-nation with a debt contracted for the Empire? Impossible. There is nothing radically mean in the colonial character: if anything, it errs on the score of liberality, where once its sense of honour is touched. To even hint *now* to the Colonies that they should recognise any liability in this obligation (to which they owe their very existence), would be ridiculous, because they have no voice in the government of the empire which it was expended to build up. But, offer them a proportionate share, as *as co-heirs*, in this Empire, and this National Debt would be transferred to the Britannic Confederation, without so much as a division! More seriously, and apart from the National Debt, is Great Britain prepared to recognise that the major portion of the huge balance must be written off as a bad debt? At present she still rules paramount over what might easily be made the coming race. This is the consideration, still hers, for the thousands of millions, to say nothing of the blood, expended. Will she allow it, of her own mere supineness, without an effort, without one single motherly call to her own flesh and blood, to pass away from her—for ever?

The taxpayer in the United Kingdom may next proceed to inquire what becomes of the enormous revenue which he is annually called upon to contribute. He will find that considerably more than half (some £50,000,000) is swallowed up in what may fairly be termed imperial expenses—that is, in army and navy, fortifications, the diplomatic and consular services, etc. About one-quarter goes to cover interest upon the National Debt. The balance, less than one-quarter, remains for purely home expenditure. Is this, in his judgment, a satisfactory state of affairs? He is begged to observe that the Colonial gets just as much out of the fifty millions as he does, and, until recently, paid not one shilling towards the amount (now he contributes towards the wages of the crews of the Australian Squadron). If he travels, he enjoys every privilege of British citizenship, the use of the consular service, the protection of the flag, and for these benefits he pays nothing. Nothing can well be clearer

than that advantages enjoyed by the whole Empire should be paid for by the whole Empire, and not by a fractional portion of it. But if it be asked why this obviously fair principle is not carried into effect, the old answer crops up: Great Britain alone furnishes the revenue necessary to give effect to and sustain her imperial policy, because she alone shapes and directs that policy. If it be true that they only who contribute should expend, it is, conversely, true that they only who expend should contribute. The Colonies, having no voice in imperial policy or expenditure, fail to see why they should have any hand in contributing. This is clear. But it is equally clear that if they *had* a voice in the imperial councils, they would necessarily bear their fair share of the imperial expenditure.

The public debts of the Empire (apart altogether from the debt of Great Britain) amount to £540,000,000, nearly three-fifths of which are represented by Colonial Government securities, and almost the whole of the entire sum is due to British investors. Now, so long as the Colonies remain under the British flag, these securities are rightly deemed to be first-class. But how would they be regarded did the Colonies blossom forth as infant republics? And it may be noted that the English Supreme Court has struck a note of warning in this connection by persistently refusing to sanction the investment of trust funds in colonial stocks. But were the Colonies definitely admitted as States of a Britannic Confederation, these same stocks would permanently rank amongst the very best securities.

Nor must it be forgotten that an enormous amount of British capital has been invested in Colonial industrial enterprises. This capital also may be regarded as safe so long as Great Britain's existing relations with the Colonies endure. But, once more, how would they be regarded in the event of these relations undergoing a rupture?

The force of these financial considerations will probably be readily admitted; indeed they are but a few amongst many. Of still greater weight are the considerations suggested by commerce, upon which Britain's very existence may be said to depend. If we examine into the existing conditions of Great Britain's trade we find that out of a total of £741,000,000, seventy-six millions represent trade with British possessions (India, etc.), other than British colonies, one hundred and seven millions with her colonies, and the balance with the rest of the World. Consequently, the colonial trade proper represents but one-seventh of the total. And the reflection suggests itself that even supposing Colonial independence to mean cessation of trade with Great Britain (which it obviously never could mean) the loss, though serious, would be by no means synonymous with commercial ruin. This is fair argument; but it is furthermore to be borne in mind that the future must be studied. Are these proportions likely to be maintained? It is not conceivable that they should. Considering that the Colonies have, all told, but a population of thirteen millions, the amount of their present trade with Britain is phenomenal—nearly half that of Britain's trade with the United States, which have a population of sixty-two millions, and one-third greater than is furnished by all other British possessions (including

highly-prized India) with their two hundred and eighty millions of Asiatics. If actually this handful of Colonials stands forth so prominently, how about the time (and no very long time either) when that handful shall double, treble, quadruple in number? Or, put it this way,—How would a proposal be received in Great Britain involving the loss of the Indian trade, or a *laissez-aller* policy tending to loss of that trade, be received? Would it not raise an outcry from John o' Groats to Land's End? Yet that much prized, exaggerated Asiatic trade is far below the Colonial trade in value, and must in the future continue to take a seat still further back, and this, too, in the face of the fact that, whereas the Colonial trade is heavily hampered by protective tariffs, that of India is almost free. Who can estimate the volume of Colonial trade which would spring up were it made *possible* for the Colonies to repeal their tariffs? I do not know. But this I know, that so long as independence is the only goal which Colonials can see in sight, they *must* and will strive, by a protective policy, to make themselves productively independent of the rest of the World, Great Britain included. Colonials are not simpletons; they are quite capable of appreciating the advantages of free trade; but they also realise what their position would be if, relying entirely upon Great Britain for manufactured goods, the mother-country even temporarily lost her command of the seas. They are not so thoroughly convinced as is the typical Jingo of Britain's invincibility, and they do not clearly understand her foreign policy. But a Britannic Confederation, of which they would be factors,—well, *that* might be considered invincible, and, at least, they would have a voice in its policy.

It need scarcely be pointed out that the continually-increasing European and American tariffs are causing the gravest anxiety in commercial circles in Great Britain; indeed it would seem to be but a question of a very few more years for these tariffs to reach the prohibitive point when commerce must cease. How about Britain's trade then? The thing is quite possible; for be it never forgotten that *Great Britain is the only nation in the World absolutely dependent upon commerce.*

A truth will always bear repetition. "Trade follows the flag." We have neither space, nor is there any necessity, here to illustrate the exactness of this time-honoured maxim further than to point out that, if the trade-returns be carefully analysed (and the work is pleasant mental recreation), its truth is verified with surprising precision. And it is natural that it should be so, for what does the flag mean save identity of commercial and national interests which all are alike impelled to assist and maintain.

(ii.) FINANCIAL-COMMERCIAL CONSIDERATIONS (*as viewed from the Colonies.*)

Upon the Colonial mind the fact that the mother-country has spent some thousands of millions sterling would make no great impression; the average settler would take it very much as a young man would take the information from his father that his education and maintenance had cost several thousands up to date—as a matter of course, with the amount of gratitude inspired by individual disposition. He might be brought to

see that he morally owes a portion of Great Britain's National Debt; but that would depend very much upon how the obligation might be placed before him.

As regards contribution towards current imperial expenses, his attitude is resolute and clear. He recognises the necessity for defence against possible attack, and that such defence costs money. To the Canadian the question is far more simple than to the Australian, and Canada has found it expedient to adopt what is practically a form of conscription as a safeguard against possible attack from the United States. But the Australian has no such towering neighbour, and very much overrates the imperial connection as his only possible source of danger. If attacked by a foreign power it could only be, he alleges, because that power would be at war with Britain upon some question to him at once trivial and unintelligible. He cares not personally one straw who owns Constantinople, or who dominates Egypt, because his trade with India is but small, and his route does not lie through the Suez Canal. His trade with Britain and with Europe does, but then there is always the alternative Cape route. But he altogether forgets that he would be exposed to at least equal perils were his political connections with Great Britain severed. What guarantee would he have that foreign nations would leave him in undisturbed possession of a vast continent were the protection of Great Britain withdrawn? How would he fare in a war with France or Germany, or even with China?

He realises that his continued progress must largely depend upon his ability to borrow largely and at a cheap rate; but he avers that he can do so, not because he flies the Union-Jack, but because British capitalists are familiar with the vast resources of his colony, and that they would continue to lend upon the strength of these resources. They have lent freely to corrupt, ill-governed, nondescript South American republics. Why not to republics peopled and governed by men of British race? But here again he overlooks much that is important. There is such a thing as borrowing too dear. The South American States have, for years, been borrowing upon exorbitant terms, have nearly all proved unable to meet even the interest upon their loans, and are hovering upon the brink of bankruptcy. Even supposing that colonies converted into republics could borrow, is it to be supposed that they could borrow at present rates? And from another point of view, is it conceivable that British capital would flow in to aid industrial enterprises, as it now does, were it being invested in infant republics?

As regards his commerce, the Colonial takes the broad platform that Great Britain would continue to trade as freely with young republics as with dependent colonies. That is doubtless mainly true. But how about that trade if British capital were withdrawn or sparingly and dearly lent? His imports would be rigidly gauged by his exports, and how could the latter be increased or even maintained without help? Let him remember that, as matters stand, British commerce is very far from being mainly dependent upon the Colonies, whereas Colonial trade is most distinctly mainly dependent upon Great Britain. It would be a bad thing for Britain to lose or to cripple her Colonial trade, but it would be more

than a bad thing for the Colonies: it would be commercial ruin. Remove the British-owned ocean-going ships from Melbourne or Sydney, and what would remain?

Nay, let the Colonial rather strive to realise that separation from Great Britain would entail stagnation and loss upon a scale which it is pitiful to contemplate. If he be driven to independence, by force of circumstances or by delay, amounting to refusal on the part of Britain to receive him into federation with her, then indeed must the burthen be borne, the loss and the stagnation endured. But, in the meanwhile, let him be somewhat more outspoken as to his willingness to accept federation if offered to him, realising that it is not the sort of proposal which a great nation can be expected to make where there is a chance of refusal.

(iii.) POLITICAL CONSIDERATIONS (*viewed from Great Britain*).

Of existing Great Powers but one, the United States, can be said to enjoy absolute immunity from attack, unless, indeed, the States themselves deliberately provoke a conflict. They have a vast continuous area, affording sufficient scope for all reasonable national dreams of expansion for many centuries to come. They are ruled by the same laws and speak the same tongue. They come up, as near as may be, to even Professor Freeman's exacting definition of an "ideal nation." Great Britain, whose empire extends, in a confused sort of way, over three times the area and five times the population, is so far from enjoying similar immunity that she may fairly be described as the most vulnerable of all and the worst prepared to repel attack. Her own shores are rather supposed to be, than known to be, safe; that is, they are still guarded by the power which has maintained them inviolate in the past—a powerful fleet. But her outlying dominions can, by no stretch of imagination, be even supposed to be safe. It would be hard to point out a single one that *is* safe—unless, perhaps, Gibraltar. And this insecurity springs from two causes, the one obvious, the other not quite so self-evident. Geographical situation is, of course, the obvious cause, and, necessarily, a permanent one, to be remedied only by increased speed of communication. The other cause lies in the ill-defined haphazard nature of her tenure of the most important of her possessions. Of course I allude more particularly to the Colonies; but even India is in the same category.

From time to time the entire patrimony of the British race has been made over in free gift to a few millions of settlers, and these are now practically as much masters of 8,000,000 square miles of territory as Great Britain herself is of the 121,000 square miles contained in the United Kingdom. Of this clear convincing proof was given in the replies returned by the various Colonial Governments to a circular sent to them by a strong committee of both Houses of Parliament asking for grants of land suitable for emigration upon a large scale. These replies were a distinct refusal all round, the clearest explanation whereof was given by Sir Henry Parkes, the Premier of New South Wales, viz., that such a proposal was utterly inconsistent with the Australian watchword, "Australia for the Australians." This, it might be thought, would

have exhausted English patience. But not at all; the emigration scheme was dropped, that was all. And, as though to justify the Colonial attitude, within two years of this incident, Great Britain conceded her last remaining million acres to forty thousand settlers in West Australia. It is not, of course, pretended that any of the Colonies have gone the length of closing their ports to would-be immigrants; nay, they encourage what are deemed to be immigrants of the right sort, that is with money in their pockets, or skilled artisans (in moderate numbers), or domestic female servants (to any extent). But these are precisely the very persons whom the mother-country can least spare.

Now, is it not high time to let it be known to the dominant democrat labour factions in all the Colonies, that neither is Australia for the Australians, nor Canada for the Canadians, nor South Africa for the South Africans, but that all these belong to, and are "for the entire British race"? And how accomplish this so effectually as by re-absorbing these somewhat self-assertive offshoots into a re-organised, federated empire? To deprive them by force of rights already conceded is out of the question. What other alternatives exist, except to allow them to drift off or break off into complete independence?

Perhaps the greatest of all advantages foreshadowed by a perfected federal policy is that, whereas a dislocated empire is a source of weakness, a securely-knit empire would be as a tower of irresistible strength. At present Britain's foreign policy really consists in playing one Great Power off against another, whilst she plays herself off as occasion may appear to offer. She is not powerful enough to hold her Empire in the teeth of the World; she knows it, and they know it. But a Britannic Confederation would be under no necessity to follow any such hide-and-seek tactics. It would from the very outset be quite strong enough to assert itself, and, if need were, to hold its own against anything short of a universal coalition—an eventuality which need hardly be taken into account. Can any reasoning man pretend that Britain would not gain enormously in political power by exchanging her present status, as harassed guardian of a confused string of possessions, for one where she would figure as Parent and Premier State in a world-wide and powerful Britannic Confederation?

(iv.) POLITICAL CONSIDERATIONS (*viewed from the Colonies*).

It has already been pointed out that the Colonial could not safely, or even securely, rely upon immunity from attack from one of the Great Powers were British protection withdrawn. But even supposing that by making concessions and by skilful diplomacy, the Colonies did contrive to secure a peaceful existence, what would their status in the World be? Each group would necessarily be at the expense of providing and maintaining an army and a fleet, and of organising and paying for a wide-spread Consular service, just as the impoverished South American republics have had to do. And what force would their diplomatic utterances carry, say, in Paris or in Berlin? Or how would Canadian rights in Behring Sea or Australian rights in the Pacific be enforced? To whom would, or could, the travelling Colonial apply for redress or assist-

ance, say, in Chili or in Persia, or anywhere else? To his consul? He might just as well apply to the nearest telegraph-post. The United States is powerful enough. Yet, during the Argentine Revolution of July 1890, I have seen the British Consulate at Rosario literally besieged by American citizens begging for *British* safe-conducts. France is powerful enough. Yet, during the last Chilian civil war, I have seen French subjects arrested and otherwise annoyed (until a French warship appeared upon the scene) to an extent which, had they been British subjects, would have brought the guns of H. M. S. *Warspite* to bear upon the *Intendencia* at Valparaiso. Germany is powerful enough. Yet she was fain to beg permission (during the same war) of the British Foreign Office to place her subjects resident in Chili under British protection. Let the colonial be well-assured that there is no such passport throughout the entire World as to be able to declare "I am a British subject." I grant that, as matters now stand, it would not add to his dignity abroad to explain that he was a Canadian or a Queenslander. But the amended form, "a subject of the Britannic Confederation," would very soon be understood as synonymous with *Noli me tangere*. Indeed, from this political point of view, the Colonies have vastly more to gain than even Great Britain herself.

NOTES ON THE INHABITANTS OF THE HIMALAYAS.

(*Read at Meeting of British Association*, 1891.)

By Colonel Tanner.

The inhabitants of the Himalayas may primarily be divided into three or four divisions, distinguished more particularly from each other by their religion, and this without taking any account of their origin, whether Aryan or Mongolian: for the religion of Asiatics forms the basis of their mode of thought and of most of their customs, and in some cases is so mixed up with their laws that their domestic life is almost, if not quite, governed by its tenets. I will, therefore, sketch out from west to east the localities occupied by Mohammedan, Hindu, Buddhist, and indefinite idolatrous mountaineers, whom one is pretty sure to encounter on the Northern Frontier of India.

The Mohammedans occupy the extreme west of the Himalayan regions, and as Sunis form the greater number of the inhabitants of Kashmir proper and of the Indus valley west of Bunji. Largely mixed with Shiahs, they hold Gilgit and Hunza and all Dardistan, by which name I mean the mountain tracts to the west of Gilgit, but nowhere else along the thousand miles between Kashmir and Assam are they to be found, except here and there, as individual or isolated families brought amongst the Hindus or Buddhists by accident.

The Hindus occupy the greater portion of Kumaon, Kangra and all Nipal, as well as the small principalities which form the Simla Hill States, and Kulu also, though in the latter country they can scarcely be called orthodox, and in reality, so far as I am aware, are Sudras, or of

the lowest class. The history of the many Hindu principalities scattered along the "middle mountains"[1] of the Himalayas is to be found in various Government offices, where many valuable records touching the Himalayan tribes have long been hidden away from public scrutiny. Here I can only say that many of the families of the rajas or chiefs have occupied their present abodes for twenty, and even thirty, generations, notwithstanding the political vicissitudes of the times following the different changes of Mohammedan, Sikh, and Gurkha rule borne by their ancestors. The old feudal castles of these chiefs present many interesting architectural features, except in those instances where hideous so-called European dwellings—often tin-roofed—have been built up over sites but lately occupied by Saracenic and Hindu buildings.

Buddhists hold in the Western and Central Himalayas the exposed elevated tracts to the north of Kashmir, Gurhwal, Kumaon, and Nipal, and occupy the whole of Bhutan.

And lastly I will name Idolaters, of various ill-defined religious or non-religious sects, who inhabit the unknown semi-independent States to the eastward of Bhutan, on both banks of the Sanpo, and the drainage areas of those rivers, unknown to us except in name, which empty themselves into the lower reaches of the Sanpo, between Sadya and Gyala Sindong. These latter, whom I by courtesy call idolaters, should, in fact, be classed amongst those who hold no religious belief whatever, and who, at most, have an indefinite conviction that some unseen malevolent power moves about in the thunder-cloud and tempest, amidst the glaciers, and in dark forbidding places of the earth, whom it might be as well occasionally to propitiate by the offering of the least valuable of their goods.

Of the four divisions into which I arbitrarily dispose of the inhabitants of the Himalayas, the Hindus and Suni Mohammedans are the best known to us, for they have been our constant study for nearly three hundred years, and, as a fruit of such study, we, as the rulers of a great Asiatic possession, have learnt how so to conduct our intercourse with them, generally as rulers, but sometimes as allies and friends, that our just and firm sway is in this age marked by an ever-increasing confidence on both sides. Our toleration of their peculiar and sometimes repugnant prejudices and customs has gained for us the respect, and almost the love, of a great number of the Queen's Asiatic subjects; but with respect to the other divisions I have named, we are not so fortunate; we are much in the dark as to their modes of thought, both from religious and secular points of view, and until we learn more about them we shall continually lay ourselves open to such disastrous rebuffs as we have lately experienced at Manipur.

In the States contiguous to the north of Kashmir, besides the well-known Suni sect of Mohammedans, we have in addition Shiahs, and a sub-division of the same sect, vaguely known to us as Maulais, followers of Ali, who, by some curious concatenation of circumstances, regard as their spiritual head or Pope a refugee Persian Prince residing in Bombay,

[1] A very convenient term used by Mr. Drew.

who holds more authority—not only spiritual, but even temporal—over a vast number of followers in the Upper Oxus States, in Kashmir, in Burmah, and, I believe, even in China, than the constituted rulers of those countries can pretend to exercise. From the far-off Pamir every Maulai feels himself bound to subscribe from his scanty means towards a yearly tribute to his spiritual lord; and across the snowy passes which lie between Central Asia and India this tribute is carried and delivered, regardless of the difficulties which for many stages beset the embassies on their journeys.

In the *Encyclopædia Britannica* the Shiah sect is treated of in great detail, giving an almost exhaustive account of their history. They were originally simply the partisans of Ali and his descendants. Even in the lifetime of Ali an effort had been made to adore him as an incarnation of the Deity, and in Persia they became divided into several sects, each holding for one or other of the descendants of Ali, and paying him the reverence due to a deity; and we may suppose that the before-mentioned Persian Prince residing in Bombay, and largely given to horse-racing in Western India—in fact, a patron of the Indian turf—is one of the descendants of the original saints so commonly regarded in olden times by the Persians as a person of the greatest sanctity. But the Maulais, as a distinct sect, appear in no published record to have been treated as if they possessed any political weight whatever.

The Persian Prince above alluded to receives adulation, and I believe more substantial recognition, from even the rulers themselves of the Upper Oxus States—those princes who claim descent from Alexander the Great, but who within the past few years have passed under the rapacious rule of the tyrant of Afghanistan. Under one pretext or other the leading and most influential of the Upper Oxus Princes have been made away with by the Ameer, and the rest must inevitably meet their fate at the hands of our Afghan ally, whose hands are steeped with the blood of every man of note in his dominions whom he might consider to have been in the least degree inimical to his rule; but such subjects as these, which perhaps verge on Asiatic politics, I must pass over as being other than geographical, and will conclude my remarks on the Shiahs by pointing out the marked difference they exhibit when contrasted with the Sunis and considered as possible subjects of the Queen, and especially in relation to their behaviour to travellers who may go amongst them in search of geographical knowledge.

The Shiahs evince little or no fanatical hatred to us as Kaffirs, and they will more readily allow us our little foibles in the way of eating ham and drinking wine than is permitted by the Sunis. They are, in fact, more get-at-able than the latter, and it seems therefore a pity that Asiatic-British subjects of this sect number so very few families.

The Sunis of Kashmir, a quiet, long-suffering people, have a considerable liking for the English, chiefly, I suppose, because we stand out in such a pleasing contrast against the oppressive and exacting ruling Hindu class. In Gilgit, also, we are well thought of; but in the Indus Valley, round Chilas, amongst a people whom we have never moved, our name carries no authority. So little regard is paid to our prestige that,

once when Colonel Biddulph had occasion to send some of his baggage over the Indus to Gilgit by the Chilas route, the goods were all sent back by the way they had been brought, with a message that the Chilasis were an independent people, who took no note of the authority of any ruler whatever. Lower down, on the Kaghán border, the tribes of the Indus Valley attacked a survey party under Mr. Scott, who escaped only after making a gallant resistance against great odds. Lower down, again, occur the Miranzais, a Pathan tribe, who have only just during the past year met their deserts from the rifles of our forces. The Indus Valley, with its numerous branch streams which join the main river between Nanga Parbat and the Black Mountain on the Peshawar border, is peopled by a number of interesting clans, of whom we know little beyond what we may learn from one of our trained explorers' reports, published many years back. They are all Sunis and mostly inveterate raiders, and, notwithstanding the repeated punishments inflicted on them year after year, will remain so for ages to come.

On the Indus the Baltis are the only Shiah Mohammedans. They of all mountaineers may be considered the most hardy and enduring under privations that few other human beings could live through. Of small physique, they are excellent mountaineers, and will carry loads over tracks but barely passable for a goat. Ill clad and poorly fed, they endure cheerfully the cold of winter or the great heats of summer. Employed in Simla, and on other hill stations, they give but little trouble to the police, notwithstanding that sometimes many hundreds may be encamped together for months at a time. The Baltis have been classed amongst the Tibetans. I believe many of them are Maulais. Their language may perhaps be a patois of Tibetan, but nothing appears to be known of it. Rondu, a town of Baltistan, is at any rate a Tibetan word; Ron, or Rong, meaning "precipitous," from the great cliffs through which the Indus flows at this place. Iskardu, or Skardu, the fruit-garden of the Indus Valley, is also a part of Baltistan, and the name is Tibetan.

Buddhists now demand for a short time our attention. In the Himalayas they occupy perhaps one-fourth or one-sixth of the habitable area of the mountain chains drained by those rivers eastward of Kashmir, which flow directly into Hindustan; and though the great mass of Tibetan and Bhutanese Buddhists remain persistently aloof from us, yet little by little our frontier officers are becoming acquainted with the ways, and, in one or two instances, with the language of these interesting races. The Buddhists of Sikkim go to our schools, where they readily acquire the knowledge the masters are able to impart; and the friendly manner in which travellers in Sikkim are treated leads one to hope that, so far as these people at least are concerned, we shall soon know all that is interesting regarding them and their ways of life, if we have not already learnt it. It is the same with the Buddhists of Lahaul and Spiti, who have been long under the ken of able observers, who, from time to time, have published interesting and complete notices of the people who inhabit these highly mountainous tracts. But with regard to the semi-Buddhist classes who skirt Tibet on the north, and the Hindu population on the south, this cannot be said. Some of these peoples are indeed

separated from us by the wide belt of the Nipal and Bhutan territories, through which we cannot hope to explore what lies behind, and those tribes with whom we are almost in touch are nevertheless situated so far away from us, that our British officials can spare but a very short period amongst them, and then only at long intervals of time. Mr. Drew, in his standard work, gives much exact information of the tribes who lie along the northern frontier of Kashmir, but the semi-Buddhist tribes now spoken of do not extend so far to the west as to be embraced in his work; and in no other publication that I am aware of are they even mentioned, though, in saying this, I confess that I have not searched through the available records so as to make such a statement authoritatively.

Along the north of Kumaon, a British district of N.-W. Provinces, one may meet one of the clans now spoken of, and round the highly picturesque villages of Budi and Garbiang these interesting and friendly people may be studied at leisure, in a climate which leaves nothing to be desired and amidst some of the grandest features of nature.

Here the people, even in this age, are so unaccustomed to the visits of Europeans, that the inhabitants—men, women, and children—will follow you about, pleased at the evident interest taken in their ways. Without wishing to be rude, and with no idea of intruding on your privacy, they will sit round your tent watching every movement. Every one of them is ready to fetch and carry for you, and, in such broken Hindustani as they can command, ready to reply to any questions you may put. A small looking-glass which I happened to possess was passed by the women from hand to hand, and a group remained for hours arranging their hair and freely passing comments on their own personal appearance, when, for the first time in their lives, examining themselves in my very minute mirror. The headmen are said to have amassed considerable wealth in the transport of borax, which for several generations has been carried through their country to India.

At Budi I witnessed the interesting funeral ceremonies of one of the inhabitants—a two days' affair—including the graceful sword and scarf dance by the men and women, and the hunting and subsequent despatch of a domestic yak, which, after being chased about under volleys of abuse, was speared and eaten. The idea was, that, by heaping indignities on the yak, the departed old woman would presently obtain, in the world to which she had been transferred, that rest and quiet which, as a dweller on earth, had been denied her.

The two villages inhabited by the semi-Buddists are the last towards the east that are accessible to Europeans, for here commences Nipal, which, for five hundred miles, occurs along the Himalayas, till at Sikkim we meet with the friendly people, who may be visited in their villages and in their monasteries, where even casual visitors will be entertained by the monks sitting in conclave with the abbot, if I may so call the head priest. These, in return for the hospitality they entertain you with, will receive any trifling present with thanks, and will pass you on to the next Gonpa or monastery, after having done all in their power to enliven your stay with music or dancing, and the drummers will escort you out of their lands far towards the next stage of your journey.

THE MAPPING OF THE WORLD.

By John George Bartholomew, F.R.S.E., F.R.G.S.

Part IV.—North America.

(With a Map.)

In the United States and Canada surveying and mapping have within recent years made more rapid progress than in almost any other part of the World. Notwithstanding this, it is to be regretted that no complete systematic topographical survey has yet been organised. In most countries the topographical survey is carried out under military direction, and results in a scientifically correct survey of all the land surface-features, physical and artificial—a map which is thus a reliable basis for all other special surveys. This, as a rule, is the best and quickest method in the long-run. In the United States and Canada, however, time could not at first be found for this thorough survey. Special maps were hurriedly prepared to meet specified wants—the Division of Lands, the War Office, the Boundaries Commission, and other State Departments. Thus, various surveys were commenced, each to meet special requirements, but as a rule regardless of general utility, unsystematic, and incomplete. In 1885, Captain Wheeler, of the U.S. Army Engineers Corps, submitted to his Government an able and exhaustive report on the surveys of the World, and therein proposed a scheme for a complete and uniform topographic survey of the States, to be carried out by the War Department; but this proposal has not yet been adopted. In the meantime the chief topographic and trigonometric survey of the United States is being carried out on a less ambitious scale in conjunction with, and under the direction of, the Geological Survey. The work of this Survey has until recently been for the most part confined to outlying and comparatively thinly-settled regions that were previously little known. Consequently, as will be seen from the accompanying sketch-map, the territories in the "Wild West," which not long ago were almost unexplored, are now better mapped than many of the densely-populated centres of civilisation in the east. The publications of this Survey, under the direction of Major Powell, are noted in Division I. of my list of United States maps. The maps are issued on three scales—viz. 1 : 62,500, or slightly less than one mile to an inch; 1 : 125,000, or about two miles to an inch : and 1 : 250,000, or about four miles to an inch. The large scale is used for the settled and populous regions, and the smaller scales for the mountainous regions and thinly-populated territories. Of the 1 : 62,500 scale, 197 sheets are now issued; of the 1 : 125,000 scale, 195 sheets; and of the 1 : 250,000 scale, 65 sheets. Prior to the establishment of the Geological Survey as the official map of the United States various organisations were in operation in regions west of the Mississippi, known as the "Geological and Geographical Survey of the Territories" (Div. II. in list); "The Rocky Mountain Region"; and "Geological Exploration of the Black Hills" (Div. III.). Under the War Department (Div. VI.) was "The

Geographical Survey of the Territory West of the 100th Meridian" and the "Geological Exploration of the 40th Parallel." The other trigonometrical surveys are "The Hydrographical Survey of the Great Northern Lakes,"[1] now finished; "The Topographical Survey of the Mississippi River," also finished; and "The Hydrographical Survey of the Atlantic, Gulf, and Pacific Coasts"[1] (including Alaskan), now nearly complete. Among other surveys of a much less topographical character than the foregoing may be mentioned some of the separate State Surveys, the Land Office, and the Post Office, Maps. I may here mention that, in estimating the value of most of these American survey maps, it must be borne in mind that, although in many cases on fairly large scales, for exactness of topographic detail they cannot be compared with European surveys.

Canadian surveys are mostly confined to the subdivision of Crown lands, and, with the exception of a minor triangulation, a few latitude and longitude observations, with reconnaissance surveys, the work consists simply in establishing standard and meridian lines, townships, and sections. The Geological Survey under Dr. Selwyn has, however, done much to amplify the maps of the Crown Lands Department. Its valuable topographical work is best shown in the special geological maps of Cape Breton Island, New Brunswick, Nova Scotia, and Eastern Quebec, now in progress. Most of its map publications appear in monographs and reports. The Hydrographic surveys of Capt. Bayfield in the St. Lawrence Basin (1850), and of the British Admiralty on the Pacific and Atlantic coasts, including Newfoundland, are at present the basis of most maps. Among incidental contributions to the mapping of the country may be mentioned the maps of the Canadian Pacific Railway. In Canada, at present, there are still large tracts in the north, north-west, and north-east that are altogether unexplored.

Mexico is now to be congratulated upon having fairly commenced a Topographical Survey of her territories, although as yet only three sheets are published. Otherwise the present maps of the country, excepting a special topographical survey of the State of Puebla, are merely reconnaissance surveys, with some coast charts. For the Central American States there are no general topographical surveys, and the maps are all more or less sketchy and incomplete. The survey by the United States Government for the proposed Nicaragua Canal is one of the most important pieces of work yet accomplished.

In the West Indies there are also no general topographical surveys, and the maps of the islands are for the most part based on charts, supplemented by reconnaissance and land-division surveys.

Summarising the mapping of North America, it will be seen from the following table that, although rapid progress has been made, yet only about 15 per cent. of the land-surface can be said to be even fairly well surveyed, compared with about 91 per cent. of topographical surveys in Europe :—

[1] These Coast Survey Maps are only mentioned in my list in cases where they have not been incorporated in other published maps.

Area of General Topographical Surveys, . .	1,150,000	sq. miles.
,, Topographical and Geographical Reconnaissance Surveys and Route Maps,	4,100,000	,,
,, General Geographical Sketch Maps (Largely approximate), . .	2,100,000	,,
,, Unexplored Territory, . . .	550,000	,,
Total Area of North America,[1] .	7,900,000	,,

In the following list of recent and authentic maps, compiled with the assistance of Mr. F. Bosse, we have only noted original survey publications, with a selection of the best general maps actually reduced from them for popular use :—

MAPS OF NORTH AMERICA.

Names of Maps published by Private Firms are printed in italics.

Only the best and most recent Government and private publications are here mentioned.

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
GENERAL MAPS.	*Stanford's Library Map of North America. By Dr. A. K. Johnston. Price 45s. London: Edward Stanford,* . . .	1 : 5,274,720	83·25	4	1890
	Johnston's Map of North America. Price 3s. London and Edinburgh: W. & A. K. Johnston, ...	1:14,982,000	236·4	1	1890
	Bartholomew's Map of North America. World Series of Travelling Maps. Price 2s. Edinburgh: J. Bartholomew & Co.,	1:10,000,000	157·3	1	1891
DOMINION OF CANADA. GENERAL MAPS.	*Dominion of Canada. By John Bartholomew. Toronto: Copp, Clark & Co.,*	1 : 5,068,800	80	1	1891
	Map of the Dominion of Canada. E. Deviller. Department of the Interior,	1 : 6,336,000	100	1	1887
	Map showing the Railways of Canada. To accompany the Annual Report on Railway Statistics. By E. V. Johnson,	1 : 2,534,400	40	3	1886
	Map of the Dominion of Canada. By E. V. Johnson. Canadian Pacific Railroad,	1 : 1,742,565	27·5	6	1886
	Map showing the Railways of Canada. To accompany Annual Report on Railway Statistics. Collingwood Schreiber, Chief Engineer and Gen. Manager, Canadian Government Railways, ...	1 : 2,851,200	45	2	1884
	British North America (Dominion of Canada and Newfoundland). London and Edinburgh: W. & A. K. Johnston,	1 : 2,770,000	44	2	1882
	Map of the Dominion of Canada. Geologically coloured from surveys made by the Geological Corps. Geological Survey of Canada, ...	1 : 1,584,000	25	2	1882
	Map showing the General Northern Limits of the Principal Forest Trees of the Dominion of Canada. By Robert Bell. Price 10c. Geological Survey of Canada, ...	1 : 5,068,800	80	1	1881

[1] Excluding Arctic Archipelago, and Greenland.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Dominion of Canada. DIVISIONAL MAPS.	*West Canada and British Columbia. Sticler's Hand-Atlas. Gotha: Justus Perthes,*	1 : 7,500,000	118·3	1	1890
	Mackinlay's Map of the Maritime Provinces of the Dominion of Canada. London: G. Philip & Sons,	1 : 480,000	7·5	4	1887
	Provinces of Ontario and Quebec. By John Bartholomew, F.R.G.S.,	1 : 1,520,640	24	2	
	The Provinces of Quebec, Ontario, New Brunswick, Nova Scotia, and Prince Edward Island, in the Dominion of Canada, with the adjacent parts of the United States. By John Arrowsmith. Price 52s. 6d. London: Edward Stanford,	1 : 1,013,760	16	8	1880
	Government Map of part of the Dominion of Canada, embracing the Provinces of Ontario, Quebec, Manitoba, New Brunswick, Nova Scotia, Prince Edward Island. Compiled under the direction of Thomas Devine. Department of Crown Lands,	1 : 1,900,800	30	2	1873
NOVA SCOTIA.	Geological Map of Cape Breton. ¼ Geological Survey of Canada,	1 : 63,360	1	24	1884
	Geological Map of part of Cape Breton, Nova Scotia. To illustrate Report for 1877-78. By Hugh Fletcher. Price 10c. Geological Survey of Canada,	1 : 63,360	1	1	1879
	Geological Map of the Sydney Coal-field, Cape Breton, Nova Scotia. By Ch. Robb and H. Fletcher. Price 10c. Geological Survey of Canada,	1 : 63,360	1	1	1876-77
	Geological Map of the Cape Dauphin District, Cape Breton, Nova Scotia. Price 10c. Geological Survey of Canada,	1 : 253,440	4	1	1874-75
	Index Map showing the position of the Springhill Coal-field. Geological Survey of Canada,	1 : 506,880	8	1	1874
	Plan of Arcadia Iron Mines. Price 10c. Geological Survey of Canada,	..	400 yds. to 1 in.	1	1873
	Coloured Geological Map of the Pictou Coal-field. Price 10c. Geological Survey of Canada,	1 : 63,360	1	1	..
PRINCE EDWARD ISLAND.	Geological Map of Prince Edward Island. Price 10c. Geological Survey of Canada,	1 : 253,440	4	5	1883-84
NEW BRUNSWICK.	Geological Map of the Province of New Brunswick,	1 : 253,440	4	10	1884
	Sketch Map of the Counties of York, Carleton, and part of Victoria. Price 10c. Geological Survey of Canada,	1 : 506,880	8	1	1866
	Map showing the distribution of the Iron Ores of Carleton County, New Brunswick, to illustrate Report of R. W. Ells. Geological Survey of Canada,	..	..	1	1875-76
	Geological Map of the Lower Carboniferous Rocks of Albert and Westmoreland Counties, New Brunswick. Showing the distribution of the Albert Shales. To illustrate the Report of Prof. L. W. Bailey and R. W. Ells. Price 10c. Geological Survey of Canada,	1 : 63,360	1	1	1876
	Map of New Brunswick. By J. E. Loggie. St. John: J. & A. MacMillan,	1 : 253,440	4	1	1885
QUEBEC.	Plan of the Asbestos Areas in the Townships of Thetford, Coleraine, Wolfestown, and Ireland. Price 10c. Geological Survey of Canada,	..	..	1	1890

Country.	Title of Map.	Scale. Natural Scale.	Miles to Inch.	Total Number of Sheets.	Date.
Dominion of Canada. QUEBEC—*continued.*	Carte régionale de la Province de Québec, comprenant les comtés de Portneuf, Québec, Montmorency, Charleroix. et partie de ceux de Saguenay, Chitotimi, Champlain et St. Maurice. Par Jules Taché. Département des Terres de la Couronne, ...	1 : 253,440	4	2	1887
	Carte régionale de la Province de Québec, comprenant les comtés de Temiscon-ata, Kamouraska, l'Islet, Montmagny, Bellechasse, Levis, et partie de ceux de Beauce, Lotbinière et Megantic. Département des Terres de la Couronne,	1 : 253,440	4	1	1885
	Geological Map of the Province of Quebec, Gaspé Peninsula, etc. Geological Survey of Canada, ...	1 : 253,440	4	10 pub.	1883-90
	Map of the Eastern Townships and Adjacent Portions of the Province of Quebec. From the Surveys of the Geological Corps. Alfred R. C. Selwyn, Director. By R. Barlow. Montreal: Dawson Brothers, . . .	1 : 253,440	4	2	1883
	Carte régionale de Province de Québec, comprenant les comtés de St. Maurice, Maskinongé Berthier, Joliette, Montcalm, L'Assomption, Jacques Cartier, Hochelaga, Laval, Terrebonne, Soulanges, Vaudreuil, Deux-Montagnes, Argenteuil et Ottawa. Département des Terres de la Couronne, . . .	1 : 253,440	4	1	1882
	Carte régionale de la Province de Québec, comprenant les comtés de Rimounski, Bonaventure et Gaspé. Département des Terres de la Couronne, . . .	1 : 253,440	4	2	1880
	Carte de la Province de Québec. Par Eugène Taché. Québec: Département des Terres de la Couronne, . . .	1 : 887,040	14	2	1880
	Coloured Map showing the distribution of Lower Silurian Rocks between the Claudière and Trois Pistoles River, South of the St. Lawrence. Geological Survey of Canada, ...	1 : 506,880	8	1	1863-66
	Map showing the distribution of the Huronian Rocks between Rivers Batchewanung and Mississagui. Geological Survey of Canada, . . .	1 : 506,880	8	1	1865
	Maps showing the distribution of Rocks belonging to the Potsdam, Quebec, and Trenton Groups on the east side of Lake Champlain, in the neighbourhood of line between Canada East and Vermont. Geological Survey of Canada,	1 : 126,720	2	1	1865
	Plan of the Island of Anticosti. Taken from Bayfield's Charts. Price 10c. Geological Survey of Canada, . .	1 : 570,240	9	1	1856
ONTARIO.	Map of the Province of Ontario, showing Counties, Townships, Railways, and Post Offices. Department of Crown Lands, ...	1 : 506,880	8	1	1887
	Geological Map of District of Rainy River. Sheet No. 4. Price 10c. Geological Survey of Canada, . . .	1 : 253,440	4	1	1887
	Sketch Map of the Thunder Bay Mining Region of Lake Superior. Price 10c. Geological Survey of Canada, . .	1 : 253,440	4	1	1887
	Geological and Topographical Map of the Silver Mountain Mining District. By E. D. Ingall. Price 10c. Geological Survey of Canada, ...	1 : 15,840	0·25	1	1887
	Geological and Topographical Map of the Madoc and Marmora Mining District. By E. Coste. Price 10c. Geological Survey of Canada, . . .	1 : 31,680	0·5	1	1886

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Dominion of Canada. ONTARIO— *continued.*	Geological and Topographical Map of the Northern Part of the Lake of the Woods and adjacent Country. By A. C. Lawson. Price 10c. Geological Survey of Canada, ...	1 : 126,720	2	1	1885
	Map of the Province of Ontario, Dominion of Canada, exhibiting the Counties and Districts therein; also the unsurveyed portions of Northern and North-Western Ontario. Toronto: Department of Crown Lands, ...	1 : 1,900,800	30	1	1884
	Map of North Shore of Lake Huron. Department of Crown Lands, . . .	1 : 380,160	6	1	1884
	Map of the Country between Lakes Superior and Winnipeg. From latest Surveys and Explorations. Published by authority of the Hon. David L. Macpherson, K.C.M.G., Minister of the Interior. Department of the Interior, ...	1 : 633,600	10	1	1884
	Plan of part of the North Shore of Lake Superior. Showing Thunder and Black Bays. Toronto: Department of Crown Lands, ...	1 : 63,360	1	5	1883
	Map showing approximately the Geology of the Basin of Moose River and adjacent Country. Price 10c. Geological Survey of Canada, ...	1 : 506,880	8	1	1883
	Plan of Moose River from the neighbourhood of Moose Factory to James Bay. By Robert Bell. Geological Survey of Canada, ...	1 : 126,720	2	1	1880-82
	Geological Map of the Lake of the Woods and adjacent Country. By R. Bell. Price 10c. Geological Survey of Canada,	1 : 253,440	4	1	1881
	Map of Lanark County and parts of Renfrew and Leeds. Price 10c., .	1 : 253,440	4	1	1874-75
	Map of the Township of Marmora, showing the position of the Gold Mines. Geological Survey of Canada, . .	1 : 63,360	1	1	1872
	Map of the Thunder Bay and Lake Nipigon Regions. To illustrate a Report on a Geological Exploration made by R. Bell. Geological Survey of Canada,	1 : 253,440	4	3	1869
	Map showing the distribution of the Rock Formations in parts of the Counties of Peterborough, Hastings, Addington, and Frontenac. Geological Survey of Canada, ...	1 : 253,440	4	1	1868
	Map showing the distribution of Laurentian Rocks in parts of the Counties of Ottawa, Terrebonne, Argenteuil, and Two Mountains. Geological Survey of Canada, ...	1 : 443,520	7	1	1865
MANITOBA.	Map of Manitoba. Published by the Provincial Government. Winnipeg, .	1 : 760,320	12	1	1890
	Topographical Map of Duck and Riding Mountains in North-Western Manitoba. By J. B. Tyrrell, assisted by D. B. Dowling. Price 10c. Geological Survey of Canada, ...	1 : 506,880	8	1	1888
	Index to the Townships in Manitoba and the N.-W. Territories, the Surveys of which have been confirmed up to the 31st Dec. 1886, ...	1 : 2,534,400	40	1	1887
	Canadian Pacific Railway Lands— From Winnipeg to second Initial Meridian (1). From second to third do. do. (2). From third to fourth do. do. (3). From fourth to fifth do. do. (4). The Topography of this Map is not guaranteed correct, ...	1 : 380,160	6	4	1886

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Dominion of Canada. MANITOBA—*continued.*	Map of the Province of Manitoba and part of the North-West Territory of Canada. Showing Dominion Land Surveys to Dec. 31st, 1884. By E. Deville, ...	1 : 792,000	12·5	3	1884
	Map of Manitoba, Kewaydin, British Columbia, and North-West Territory. Showing the Country traversed by the Canadian Pacific Railway. Montreal: Dawson Brothers, ...	1 : 2,851,200	45	2	1883
	Map of the Province of Manitoba. C. E. Codd, Del. Department of Public Works. Winnipeg: Robert D. Richardson, ...	1 : 380,160	6	8	1882
	General Map of part of the North-West Territories, including the Province of Manitoba. Showing Dominion Land Surveys. Published by order of the Right Hon. Sir A. Macdonald, K.C.B., Minister of the Interior, . . .	1 : 2,534,400	40	1	1882
	Map of Lake Winnipeg. To accompany Dr. Bell's Report. Price 10c. Geological Survey of Canada, . . .	1 : 506,880	8	1	1878
NORTH-WEST TERRITORY. SASKATCHEWAN. ASSINIBOIA.	Report of the Select Committee of the Senate appointed to inquire into the resources of the Great Mackenzie Basin. With Maps, ...	..	..	..	1888
	Map of a portion of the Yukon District, with the adjacent Northern Part of British Columbia. To accompany Report of George M. Dawson. Price 10c. Geological Survey of Canada, . .	1 : 506,880	8	3	1888
	Index Map of the Yukon District, the Northern Portion of British Columbia, and adjacent Regions. To accompany Report of George M. Dawson. Price 10c. Geological Survey of Canada, .	1 : 3,801,600	60	1	1888
	Geological Map of part of Northern Alberta, and portions of the Districts of Assiniboia and Saskatchewan, North-West Territory. By J. Tyrrell. Price 10c. Geological Survey of Canada, .	1 : 506,880	8	1	1887
	Map showing Wooded and Prairie Tracts, etc., in part of Northern Alberta and portions of the Districts of Assiniboia and Saskatchewan, North-West Territory. By J. Tyrrell. Price 10c. Geological Survey of Canada, . . .	1 : 506,880	8	1	1887
	Maps showing Mounted Police Stations throughout the North-West Territories. By J. Macdonald, . . .	1 : 1,013,760	16	1	1887
	Geological Map of the Northern Part of the Dominion of Canada east of the Rocky Mountains. Compiled by George M. Dawson. Price 10c. Geological Survey of Canada, . . .	..	..	1	1886
	Geological Map of part of the Cascade Coal Basin, Rocky Mountains. To illustrate Report by G. M. Dawson. Price 10c. Geological Survey of Canada,	1 :	..	1	1886
	Map showing Wooded Tracts and character of Surface of the Cypress Hills, Wood Mountain, and adjacent Country. By G. M'Connell. Price 10c. Geological Survey of Canada, . . .	1 : 506,880	8	1	1885
	Geological and Topographical Map of the Cypress Hills, Wood Mountain, and adjacent Country. Price 10c. Geological Survey of Canada, . .	1 : 506,880	8	1	1885
	Geological Map of the Region in the vicinity of the Bow and Belly Rivers. By George W. Dawson. Price 10c. Geological Survey of Canada, . .	1 : 506,880	8	1	1884

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Dominion of Canada. N.W. TERRITORY ETC.—*continued.*	Map showing Wooded and Prairie Tracts, etc., in the Region in the vicinity of the Bow and Belly Rivers. By George M. Dawson. Price 10c. Geological Survey of Canada,	1 : 506,880	8	1	1884
	Map of part of the Athabasca River. To Illustrate Dr. R. Bell's Explorations. Geological Survey of Canada,	1 : 506,880	8	1	1884
	District of Athabasca. By E. F. T. Petitot. Proceedings of the Royal Geographical Society,	1 : 1,750,000	27·6	1	1883
	Index Map of Coal and Lignite Outcrops, Bow and Belly River District. To illustrate Report by G. M. Dawson. Price 10c. Geological Survey of Canada,	1 : 633,600	10	1	1882
	Map of Island and God's Lakes, and of the connecting Waters to Oxford Lake. From Track Surveys by A. S. Cochraine. Price 10c. Geological Survey of Canada,	1 : 253,440	4	1	1879
	Map of Nelson River and the Boat Route between Lake Winnipeg and Hudson's Bay. From Track Surveys by R. Bell,	1 : 506,880	8	1	1878
	Plan of Mouth of Hayes River and vicinity of York Factory. By R. Bell. Price 10c. Geological Survey of Canada,	1 : 63,360	1		1878
	Sketch Survey of Route from Quesnel Month by Stewart and M'Leod Lakes to the Junction of Smoky River and Peace River. Price 10c. Geological Survey of Canada,	1 : 380,160	6	1	1876
	Sketch Map of Route from the Forks of Peace and Smoky Rivers to Carlton Ho., Saskatchewan River. Price 10c. Geological Survey of Canada,	1 : 2,534,400	40	1	1876
	Carte du Bassin du Mackenzie, dressée de 1862-73. Par E. Petitot. Bull. Soc. Géogr. Paris,	1 : 2,100,000	33·1	1	1875
	Sketch Survey of the Saskatchewan River from Rocky Mountain House to Cumberland Lake. Price 10c. Geological Survey of Canada,	1 : 1,013,760	16	1	1873-74
BRITISH COLUMBIA.	Reconnaissance Map of a portion of the West Kootanie District. Geological Survey of Canada,	1 : 506,880	8	1	1890
	Map of the Lands comprised within the Railway Belt. Ottawa,	1 : 800,000	12·5	1	1889
	Quartz Veins and Placer Mines of Island Mountain and Mosquito Creek in Cariboo District. Price 10c. Geological Survey of Canada,	1 : 6,000	500 feet.	1	1887
	Map of the Cariboo Mining District. By Amos Bowman. Price 10c. Geological Survey of Canada,	1 : 126,720	2	1	1887
	Placer Mines of Harvey Creek in Cariboo District. By Amos Bowman. Geological Survey of Canada,	1 : 126,720	2	1	1887
	Map to accompany Report of T. B. Steele, commanding Mounted Police in British Columbia,	1 : 1,013,760	16	1	1887
	Reconnaissance Map of a portion of the Rocky Mountains between latitudes 49° and 51° 30′. Geologically coloured by George M. Dawson. Price 10c. Geological Survey of Canada,	1 : 380,160	6	1	1886
	Veins and Placer Mines of Hixon Creek, in Cariboo District. Price 10c. Geological Survey of Canada,	1 : 25,355	0·4	1	1885-86

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Dominion of Canada. BRITISH COLUMBIA—*continued.*	Map of the Province of British Columbia. Compiled and drawn by Edward Mohun, C.E. By instruction of the Hon. W. Smithe, Chief Commissioner of Lands and Works. Montreal: Dawson, Brothers, ...	1 : 3,168,000	50	1	1884
	West Coast of North America, 51° 30′—55° 30′. Washington: Hydrographic Office, ...	..	..	1	1883
	Map of a part of British Columbia and the North-West Territory, from the Pacific Ocean to Fort Edmonton. By G. W. Dawson. Geological Survey of Canada, ...	1 : 506,880	8	3	1881
	Geological Map of the Queen Charlotte Islands. To illustrate Report by George M. Dawson. Price 10c. Geological Survey of Canada, . . .	1 : 506,880	8	1	1881
	Map illustrating the distribution of some of the more important Trees in British Columbia. By George M. Dawson. Price 10c. Geological Survey of Canada, ...	1 : 3,168,000	50	1	1880
	Sketches of Harbours, Queen Charlotte Islands. Price 10c. Geological Survey of Canada, ...	1 : 146,073	2 nautical miles.	1	1878
	Geological Map of a portion of the Southern Interior of British Columbia. By George M. Dawson. Price 10c. Geological Survey of Canada, . .	1 : 506,880	8	1	1877
	Map of a portion of British Columbia, showing the Coal-fields of Comox Nanaimo and Cowitchin on Vancouver, and adjacent Islands. To illustrate the Report of Mr. James Richardson. Price 10c. Geological Survey of Canada, .	1 : 253,440	4	1	187 7
	Geological Map of a portion of British Columbia between the Fraser River and the Coast Range. By George M. Dawson. Price 10c. Geological Survey of Canada, ...	1 : 506,880	8	1	1875-76
	Map of a part of the Strait of Georgia and of Vancouver Island, showing a portion of the Comox Coal-field and the distribution of the Cretaceous Coal-Bearing Rocks. Geological Survey of Canada, ...	1 : 126,720	2	1	1873
	Map showing the position of the Coal-fields of Nanaimo and Comox. Vancouver Island. Out of print. Geological Survey of Canada, . . .	1 : 633,600	10	1	1872
NEWFOUNDLAND.	Land surface features of New-Foundland. Price 8s. By Alex. Murray, F.G.S. London: E. Stanford, ...	1 : 1,584,000	25	1	1881
	Geological Map of Newfoundland. Price 10s. London: E. Stanford, . .	1 : 1,584,000	25	1	1881
	Peninsula of Avalon. London: E. Stanford, ...	1 : 15,842	0·25	1	1881
	An Orographical Map of Newfoundland, showing by contours the Levels of the Land and the Depths of the Sea. Edited by Alex. Murray, F.G.S., Director of the Geological Survey of New-Foundland. Price 20s. (coloured). London: Edward Stanford, . .	1 : 443,520	7	6	1881
LABRADOR PENINSULA.	*Map of the Peninsula of Labrador. Proceedings of the Royal Geogr. Society,* .	1 : 8,236,800	Central 130	1	1888
	Hudson Bay and Strait. Price 3s. Admiralty Chart, ...	1 : 2,191,111	Nautic. 30	1	1888
	Map of the Peninsula of Labrador. By F. Leuthner. Bull. Americ. Geogr. Soc.,	1 : 5,000,000	18·9	1	1887
	Map of Lake Mistassini with Geological Boundaries. Price 10c. Geological Survey of Canada, ...	1 : 506,880	8	1	1886

Country	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
British N. America. LABRADOR—*continued.*	Plan indiquant les Routes suvies par le Père Babel pendant les annees 1866-67-68-70. Quebec: Département des Terres de la Couronne, . . .	1 : 1,013,760	16	1	1885
	Labrador. Admiralty Chart. Price 1s. 6d.,	1 : 2,434,552	33·3	1	1884
	Sandwich Bay to Nain, including Hamilton Inlet. Price 2s. Admiralty Chart,	1 : 730,370	10	1	1881
	Entrance to Hamilton Inlet and adjacent Harbours. Price 2s. 6d. Admiralty Chart, ...	1 : 730,370	10	1	1880
	Map of Part of the East Coast of Hudson's Bay. Price 10c. Geological Survey of Canada, ...	1 : 253,440	4	1	1877
UNITED STATES.* GENERAL MAPS.	*Karte der Vereinigten Staaten. Von A. Petermann. Stielers Hand-Atlas. Gotha: Justus Perthes,*	1 : 3,700,000	58·3	6	1890
	Karte von Zentral Amerika amd West-Indien bis zum Südlichen Canada. Von A. Petermann. Stielers Hand-Atlas. Gotha: Justus Perthes, ...	1 : 7,500,000	118·3	4	1890
	General Travelling Map of United States. By J. Bartholomew, F.R.G.S. Price 2s. Edinburgh: J. Bartholomew & Co., .	1 : 3,800,000	60	2	1889
	United States. Compiled under the direction of Henry Gannett, Chief Topographer, by Harry King, Chief Draughtsman. Department of the Interior. United States Geological Survey. J. Powell, Director, . .	1 : 2,500,000	39·4	9	1890
Special Maps.	**DIV. I.**—General Geological Survey.† Trigonometrical and Togographical. (J. Powell, Director.				
ALABAMA.	Alabama—				
	Long. 85° 30'—87° ; lat. 33°—34	1 : 125,000	1·9	3	1886-91
	Long. 85°—86° 30' ; lat. 34°—34° 30'			3	1886
	Long. 85° 30'—87° ; lat. 34° 30'—35°			3	1886
	Long. 86° —87° ; lat. 32° 30'—33° 30'			3	1890
	Long. 86°—86° 30' ; lat. 33° 30'—34°			1	1889
ARKANSAS.	Arkansas—				
	Long. 92° —94° ; lat. 34° 30'—36°	1 : 125,000	1·9	6	1889-90
	Long. 93° 30'—94° ; lat. 35°—35° 30'			1	1890
	Arkansas-Indian Territory—				
	Long. 94°—94° 30' ; lat. 35°—35° 20'			1	1890
	Long. 94°—94° 30'; lat. 34° 30'—35°			1	1890
CALIFORNIA.	California—				
	Long. 120° 30'—121° ; lat. 38°—39° 30'	1 : 125,000	1·9	3	1889
	Long. 121° —122° ; lat. 39°—39° 30'			2	1887
	Long. 120°—123° ; lat. 40°—41°	1 : 250,000	3·9	3	1886
	Long. 121°—123° ; lat. 41°—42°			3	1886
COLORADO.	Colorado—				
	Long. 106° 45'—107° 15'; lat. 38° 45—39°	1 : 62,500	0·9	2	1889
	Long. 103°—103° 30' ; lat. 37° 30'—39°	1 : 125,900	1·9	3	1890-91
	Long. 103° 30'—104° ; lat. 37° 30'—39°			3	1890-91
	Long. 104°—104° 30' ; lat. 37° 30'—39°			3	1890-91
	Long. 104° 30'—105° ; lat. 38°—38° 30'			1	1890-91
CONNECTICUT.	Connecticut, ...	1 : 62,500	0·9	34	1891
GEORGIA.	Georgia—				
	Long. 84°—85° ; lat. 34°—34° 30'	1 : 125,000	1·9	4	1890
	Long. 83° 30'—85° ; lat. 34° 30'—35°			3	1886-87
	Long. 84° —84° 30' ; lat. 33° 30'—34°			1	1890
	Georgia-Alabama—				
	Long 85°—85° 30' ; lat. 33° 30'—34°			1	1889
	Georgia-South Carolina—				
	Long. 83°—83° 30' ; lat. 34° 30'—35°			1	1886

* The United States maps are not arranged in general geographical order, but are grouped under the headings of the various departments which issue them. I have here used seven divisions.

† This Survey publishes in three different scales, according to the importance of the district. The sheets of the 1 : 62,500 scale each include an area of 15′ of longitude and latitude, the 1 : 125,000 an area of 30′, and the 1 : 250,000 an area of 1 degree.

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
United States.	Idaho—				
IDAHO.	Long. 115°—116°; lat. 43′—43° 30′	1 : 12 000	1·9	2	1890-91
ILLINOIS.	Illinois-Missouri—				
	Long. 90°—90° 15′; lat. 38° 30′—38° 45′	1 : 62,500	0·9	1	1889
	Long. 87° 45′—88°; lat. 41° 30′—41° 45′			2	1890-91
IOWA.	Iowa—				
	Long. 91°—91° 15′; lat. 41° 30′—42° 15′	1 : 62,500	0·9	3	1889
	Long. 91° 45′—92°; lat. 41° 45′—42°			1	1889
	Long. 91° 30′—92°; lat. 42°—42° 15′			3	1889
	Long. 90° 30′—90° 45′; lat. 41° 30′—42° 15′			3	1890-91
	Long. 90° 45′—91°; lat. 41° 30′—42° 15′			3	1890-91
KANSAS.	Kansas—				
	Long. 95°—97° 30′; lat. 37°—37° 30′	1 : 125,000	1·9	5	1886-90
	Long. 95°—97° 30′; lat. 37° 30′—38°			5	1886-89
	Long. 95°—97° 30′; lat. 38°—38° 30′			5	1886-89
	Long. 95°—96°; lat. 38° 30′—39°			2	1886
	Long. 96° 30′—97° 30′; lat. 38° 30′—39°			2	1886-89
	Long. 95°—97°; lat. 39°—39° 30′			4	1887
	Long. 95° 30′—97°; lat. 39° 30′—40°			3	1887
	Long. 97° 30′—98°; lat. 37°—38° 30′			3	1890-91
	Long. 98°—98° 30′; lat. 37°—38° 30′			3	1890-91
	Long. 98° 30′—99°; lat. 37° 30′—38° 30′			2	1890-91
	Long. 99°—99° 30′; lat. 37° 30′—38° 30′			2	1890-91
	Long. 99° 30′—100°; lat. 37° 30′—38° 30′			2	1890-91
	Kansas-Missouri—				
	Long. 94° 30′—95°; lat. 39°—39° 30′			1	1890
	Long. 95°—95° 30′; lat. 39° 30′—40°			1	1886
KENTUCKY.	Kentucky—				
	Long. 82° 30′—84°; lat. 37°—38°	1 : 125,000	1·9	4	1886
	Kentucky-Tennessee—				
	Long. 84°—84° 30′; lat. 36° 30′—37°			1	1889
	Kentucky-Virginia—				
	Long. 82° 30′—83°; lat. 37°—37° 30′			1	1886
	Kentucky-Virginia-Tennessee—				
	Long. 82° 30′—84°; lat. 36° 30′—37°			3	1886-87
MAINE.	Maine-New Hampshire—				
	Long. 70° 30′—71°; lat. 43°—43° 15′	1 : 62,500	0·9	2	1890
	Long. 70° 15′—37° 30′; lat. 43° 15′—43° 45′			2	1890-91
	Long. 70° 30′—71°; lat. 43° 15′—43° 45′			2	1890-91
MARYLAND.	Maryland—				
	Long. 76° 30′—76° 45′; lat. 39° 10′—39° 25′	1 : 62,500	0·9	1	1890
	Maryland—District of Columbia (Virginia)—				
	Long. 76° 45′—77° 15′; lat. 38° 45′—39°			2	1887
	Maryland-West Virginia—				
	Long. 79°—79° 30′; lat. 39°—39° 30′	1 : 125,000	1·9	1	1886
MASSACHUSETTS.	Massachusetts. Survey completed, and all sheets published, ...	1 : 62,500	0·9	54	1891
	Map of Massachusetts, ...	1 : 250,000	3·9	4	1889
MISSOURI.	Missouri-Illinois—				
	Long. 90° 15′—90° 30′; lat. 38° 30′—38° 45′	1 : 62,500	0·9	1	1889
	Missouri—				
	Long. 91° 30′—94°; lat. 39°—39° 30′	1 : 125,000	1·9	5	1890
	Long. 91°—94° 30′; lat. 38° 30′—39°			7	1887-90
	Long. 92°—94° 30′; lat. 38°—38° 30′			5	1887
	Long. 93°—94° 30′; lat. 37°—38°			6	1886
	Missouri-Kansas—				
	Long. 94° 30′—95°; lat. 37°—39°			4	1886-87
	Missouri-Illinois—				
	Long. 91°—91° 30′; lat. 39°—39° 30′			1	1890
NEVADA.	Nevada—				
	Long. 114°—115°; lat. 36°—37°	1 : 250,000	3·9	1	1886
	Long. 114°—115°; lat. 37°—38°			1	1886
	Long. 119°—120°; lat. 40°—41°			1	1886
	Long. 117°—120°; lat. 41°—42°			3	1886-90
	Long. 119° 30′—120°; lat. 39°—39° 30′	1 : 125,000	1·9	1	1890-91
NEW HAMPSHIRE VERMONT.	New Hampshire-Vermont—				
	Long. 72° 30′—72° 45′; lat. 42° 45′—43°	1 : 62,500	0·9	1	1890-91
NEW JERSEY.	New Jersey. Survey completed, and sheets all published, ...	1 : 62,500	0·9	50	1891
NEW YORK.	New York—				
	Long. 73° 45′—74°; lat. 40°—40° 15′	1 : 62,500	0·9	1	1890-91
	New York-Connecticut—				
	Long. 73° 30′—73° 45′; lat. 41°—41° 15′	1 : 62,500	0·9	1	1890-91

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States.					
NEW YORK—*continued.*	New York-New Jersey—				
	Long. 73° 45′—74° 15′; lat. 40° 45′—41° 15	1 : 62,500	0·9	2	1890-91
	Long. 74°—74° 15′; lat. 40° 30′—40° 45′			1	1890-91
	Long. 74° 15′—74° 30′; lat. 41°—41° 15′			1	1890-91
NORTH CAROLINA.	North Carolina—				
	Long. 83°—84°; lat. 35°—35° 30′	1 : 125,000	1·9	2	1886
	Long. 82°—82° 30′; lat. 35° 30′—36°			1	1889
	Long. 81°—81° 30′; lat. 36°—36° 30′			1	1890-91
	North Carolina-South Carolina—				
	Long. 82°—83°; lat. 35°—35° 30′			2	1889
	North Carolina-Tennessee—				
	Long. 82° 30′—83°; lat. 35° 30′—36°			1	1889
OREGON.	Oregon—				
	Long. 121°—122°; lat. 42°—43°	1 : 250,000	3·9	1	1889
PENNSYLVANIA.	Pennsylvania—				
	Long. 75°—75° 15′; lat. 40°—40° 15′	1 : 62,500	0·9	1	1889
	Long. 75° 30′—75° 45′; lat. 41° 15′—41° 30′			1	1890-91
	Long. 76° 15′—76° 30′; lat. 40° 15′—40° 30′			1	1890-91
	Long. 76° 15′—76° 30; lat. 40° 45′—41°			1	1890-91
RHODE ISLAND.	Rhode Island	1 : 62,500	0·9	15	..
	Survey completed, and sheets all published,				
SOUTH CAROLINA.	South Carolina—				
	Long. 82° 30′—83°; lat. 34° 30′—35°	1 : 125,000	1·9	1	1887
TENNESSEE.	Tennessee—				
	Long. 84° 30′—85° 30′; lat. 35°—35° 30′	1 : 125,000	1·9	2	1886-87
	Long. 83°—85°; lat. 35°—36° 30′			4	1886-87
	Tennessee-Georgia—				
	Long. 85°—85° 30′; lat. 34° 30′—35°			1	1886
	Tennessee-North Carolina—				
	Long. 84°—84° 30′; lat. 35°—35° 30′			1	1886
	Long. 83°—84°; lat. 35° 30′—36°			2	1886
	Long. 82°—83°; lat. 36°—36° 30′			2	1886
TEXAS.	Texas—				
	Long. 97°—99° 30′; lat. 30°—30° 30′	1 : 125,000	1·9	5	1887
	Long. 97°—99° 30′; lat. 30° 30′—31°			5	1887
	Long. 98°—99°; lat. 31°—31° 30′			2	1887
	Long 97° 30′—99° 30′; lat. 31° 30′—32°			4	1887-89
	Long 96° 30′—98° 30′; lat. 32°– 30° 33′			4	1889-91
	Long. 97°—97° 30′; lat. 32°—32° 30′			1	1890-91
	Long. 99°—100°; lat. 32° 30′—33°			2	1890-91
VERMONT.	Vermont—				
	Long. 72° 45′—73°; lat. 42° 45′—43°	1 : 62,500	0·9	1	1890-91
VIRGINIA.	Virginia-North Carolina—				
	Long. 80° 30′—81° 30′; lat. 36° 30′—37°	1 : 125,000	1·9	2	1889
	Virginia-Tennessee-North Carolina—				
	Long. 81° 30′– 82°; lat. 36° 30′—37°			1	1889
	Virginia-Tennessee—				
	Long. 82°—82° 30′; lat. 36° 31′—37°			1	1889
	Virginia—				
	Long. 79° 30′—80°; lat. 37°—37° 30′			1	1890
	Virginia-West Virginia—				
	Long. 80°—82°; lat. 37°—37° 30′			4	1887-90
	Virginia-Kentucky—				
	Long. 82°—82° 30′; lat. 37°—37° 30′			1	1889
	Virginia—				
	Long. 77° 30′—79°; lat. 38°—38° 30′			3	1889
	Long. 77° 30′—78° 30′; lat. 38° 30′—39°			2	1889
	Long. 77° 30′—78°; lat 37° 30′—38°			1	1890
	Long. 78°—79°; lat. 37°—38°			3	1889
	Virginia-West Virginia-Maryland—				
	Long. 77° 30′—78°; lat. 39°—39° 30′			1	1889
	Virginia-Maryland—				
	Long. 77°—77° 30′; lat. 38° 30′—39°			1	1890
	Virginia-West Virginia—				
	Long. 78° 30′—79°; lat. 38° 30′—39°			1	..
	Long. 79°—79° 30′; lat. 37° 30′—38°			1	1889
	Long. 79°—79° 30′; lat. 38°—38° 30′			1	..
	Long. 79° 30′—80°; lat. 37°—37° 33′			1	1890-91
	Long. 80° 30′—81°; lat. 37°—37° 30′			1	1890-91
WEST VIRGINIA.	West Virginia—				
	Long. 81°—82°; lat. 37° 30′—38°	1 : 125,000	1·9	2	1886
	Long. 79° 30′—80°; lat. 39°—39° 30′			1	1886

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States.					
WEST VIRGINIA—*continued.*	West Virginia-Virginia—				
	Long. 78°—78° 30′; lat. 39°—39° 30′	1 : 125,000	1·9	1	1886
	Long. 79°—80°; lat. 38° 30′—39°			2	1887
	Long. 78° 30′—79°; lat. 39°—39° 30′			1	1889
	West Virginia-Kentucky—				
	Long. 82°—82° 30′; lat. 37° 30′—38°			1	1887
	Long. 80°—81°; lat. 38°—38° 30′			3	1890-91
WISCONSIN.	Wisconsin—				
	Long. 89°—89° 30′; lat. 42° 45′—43° 15′	1 : 62,500	0·9	3	1889
	Long. 89° 15′—89° 30′; lat. 43°—43° 15′			1	1890
ARIZONA.	Arizona—				
	Long. 109°—113°; lat. 34°—35°	1 : 250,000	3·9	4	1887
	Long. 109°—115°; lat. 35°—36°			6	1884
	Long. 109°—114°; lat. 36°—37°			5	..
MONTANA.	Montana—				
	Long. 110°—113°; lat. 45°—46°	1 : 250,000	3·9	3	1889
	Long. 109°—113°; lat. 46°—47			4	1889
	Long. 110°—112°; lat. 47°—48°			2	1890
	Long. 107°—109°; lat. 35°—36°	1 : 250,000	3·9	2	1884
	Long. 107°—109°; lat. 36°—37°			2	1889
NEW MEXICO.	New Mexico—				
	Long. 106° 30′—107°; lat. 35°—35° 30′	1 : 125,000	1·9	1	1889
	Long. 106°—107°; lat. 35° 30′—36°			2	1890
UTAH.	Utah—				
	Long. 109°—114°; lat. 37°—38°	1 : 250,000	3·9	5	.
	Long. 109°—113°; lat. 38°—39°			4	..
	Long. 109°—113°; lat. 39°—40°			4	..
	Long. 109°—113°; lat. 40°—41°			4	..
YELLOWSTONE NATIONAL PARK.	Yellowstone National Park—				
	Long. 110°—111°; lat. 44° 30′—45°	1 : 125,000	1·9	2	1886
	Yellowstone National Park, Wyomin —				
	Long. 110°; lat. 44°			2	1886
	Long. 111°; lat. 44° 30′				
	SPECIAL MAPS.*				
	(*Issued with Geol. Sur. Reports*).				
	Geological Map of Cape Ann, . . .	1 : 62,500	0·9	3	1887-88
	Geological Map of a portion of North-Western Colorado and adjacent parts of Utah and Wyoming Territories. By Ch. A. White, ... *9th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 1,267,200	20·0	1	1887-88
	Hydrographic Map of Lake Mono, . .	1 : 250,000	3·9	1	1886-87
	Morainal Embankment of Parker and Bloody Cañons, ...	1 : 50,000	0·7	1	1886-87
	Geological Map of Lassen Peak District,	1 : 400,000	6·3	1	1886-87
	Geological Map of portions of Ohio and Indiana. By Ed. Orton, ...	1 : 1,267,200	20·0	1	1886-87
	Geological Map of Mt. Desert Island. By N. T. Shaler, ... *8th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 100,000	1·5	1	1886-87
	Map of the Glacial Striæ of the Eastern United States. By T. C. Chamberlin, *7th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 9,504,000	150·0	1	1885-86
	Geological Map of N.-Western Mexico, .	1 : 633,600	10·0	1	1884-85
	General Map of the Drift of N.-Eastern United States, showing the relations of the Driftless Area, ...	1 : 9,504,000	150·0	1	1884-85
	Geological Map of Driftless Region and Environs. By T. C. Chamberlin and R. D. Salisbury, ... *6th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 950,400	15·0	1	1884-85

* See also Geological Survey Maps under Div. 7, "Separate State Surveys."

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. Division I.—*continued.*	Preliminary Geological Map of the United States. By M'Gee,	1 : 6,500,000	102·5	1	1883-84
	Preliminary Map of the North-West of Lake Superior and Lake Michigan,	1 : 4,000,000	63·1	1	1883-84
	Topographical Sketch of Mount Shasta, *5th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 63,360	1·0	1	1883-84
	Map of the N.-Western part of the Great Basin, showing Quaternary Lakes, etc.,	1 : 1,520,640	24·0	1	1882-83
	Map of the N.-Western part of the Great Basin, showing Fault Lines, *4th Annual Report U.S. Geol. Survey. J. Powell.*	1 : 1,520,640	24·0	1	1882-83
	Geological Map of Lake Superior,	1 : 2,000,000	31·5	1	1881-82
	Geological Map of Keweenaw Point, Michigan,	1 : 200,000	3·1	1	1881-82
	Geological Map of the Porcupine Mts., Michigan,	1 : 125,000	1·9	1	1881-82
	Geological Map of the Region between Ontonagon River, Michigan, and Namakagon Lake, Wisconsin,	1 : 300,000	4·7	1	1881-82
	Geological Map of the North-Western Coast of Lake Superior,	1 : 400,000	6·3	1	1881-82
	Geological Map of the Isle of Royale and neighbouring Mainland,	1 : 873,680	13·8	1	1881-82
	Geological Map of the Eureka District, Nevada,	..	..	1	1881-82
	General Map of Terminal Moraine of the Second Glacial Epoch. By T. C. Chamberlin,	1 : 9,504,400	150	1	1881-82
	Map of the Green Bay Loop of the Terminal Moraine of the Second Glacial Epoch. By T. C. Chamberlin,	1 : 1,900,800	30	1	1881-82
	Map of a portion of the Moraine (Wisconsin, Indiana, Michigan, and Ohio). By T. C. Chamberlin,	1 : 3,801,600	60	1	1881-82
	Map of a portion of the Moraine (New York, New Jersey, and New England). By T. C. Chamberlin,	1 : 3,801,600	60	1	1881-82
	Map of a portion of the Moraine (Minnesota, Iowa, and Dakota). By T. C. Chamberlin, *3d Annual Report U.S. Geol. Survey. J. Powell.*	1 : 3,801,600	60	1	1881-82
	Geological Map of Ruby Hill, Eureka Mining District, Nevada,	1 : 19,200	1600 ft.	1	1880-81
	Geological Map of Leadville and vicinity, Lake Co., Colorado,	1 : 31,680	0·5	1	1880-81
	Geological Map of Virginia, Nevada, and immediate vicinity,	1 : 19,200	1600 ft.	1	1880-81
	Sketch Map showing the Distribution of the Strata and Eruptive Rocks in the Western Part of Plateau Province, *2d Annual Report U.S. Geol. Survey. J. Powell.*	1 : 1,013,760	16	1	1880-81
	DIV. II.—Geological and Geographical Surveys of the Territories.				
	General Geological Map of the Area Explored and Mapped by Dr. F. V. Hayden, and Surveys under his Charges, 1869-80,	1 : 2,600,000	41·03	1	1883
	Geological and Geographical Atlas of Colorado and portions of adjacent territory. By F. V. Hayden,	..	..	..	1878
	General Sheets (Drainage, Geological, Economic and Triangulation),	1 : 760,320	12	4	..
	Detailed Sheets (Geological and Geographical),	1 : 253,440	4	12	1878
	The Moqui Mesas, Province of Tusayan, Arizona,	1 : 63.360	1	1	1878

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. Division II.—*continued.*	Map of the Region occupied by the ancient Ruins in Southern Colorado, Utah, and Northern New Mexico and Arizona,	1 : 760,320	12	1	1878
	Economic Map of Wyoming, Idaho, and Utah,	1 : 506,880	8	1	1878
	Geological Map of portions of Wyoming, Idaho, and Utah,	1 : 506,880	8	1	1878
	Part of Central Wyoming (Geological),	1 : 253,440	4	1	1878
	Part of Central Wyoming (Drainage),	1 : 253,440	4	1	1878
	Parts of Western Wyoming and South-Eastern Idaho (Geological),	1 : 253,440	4	1	1878
	Parts of Western Wyoming and South-Eastern Idaho (Drainage),	1 : 253,440	4	1	1878
	Parts of Western Wyoming, South-Eastern Idaho, and North-Eastern Utah (Geological),	1 : 253,440	4	1	1878
	Parts of Western Wyoming, South-Eastern Idaho and North-Eastern Utah (Drainage),	1 : 253,440	4	1	1878
	Preliminary Geological Map of the Yellowstone National Park (Drainage),	1 : 253,440	4	2	1878
	Hypsometric Map of the United States,	1 : 6,336,000	100	1	1877
	Sierra La Tal, Utah,	1 : 348,480	5·5	1	1877
	Map of the Sources of the Snake River with its Tributaries, together with portions of the Headwaters of the Madison and Yellowstone. By G. R. Bechler,	1 : 633,600	10	1	1873
	Twin Lakes, Arkansas Valley, showing adjacent Moraines,	1 : 63,360	1	1	1873
	Map of Nebraska and Dakota and portions of the States and Territories bordering thereon. Compiled by Major-General Warren. Geology by Hayden,	1 : 1,200,000	1	1	1872
	Sketch of Lake Henry and the Sources of West Fork of Snake River, including Taghee, Madison, and Red Rock Passes. By G. R. Bechler,	1 : 126,720	2	1	1872
	Lower Geyser Basin on the Upper Madison,	1 : 633,600	10	2	1872
	Upper Geyser Basin on the Upper Madison,				
	Map of Shoshone Geysers on the South-Western Terminus of Shoshone Lake,	1 : 506,880	8	1	1872
	Sources of Snake River with its Tributaries,	1 : 316,800	5·0	1	1872
	Montana and Wyoming Territories,	1 : 760,320	12·0	1	1872
	Sources of the Madison, Gallatin, and Upper Yellowstone,	1 : 253,440	4·0	1	1872
	Lower Geyser Basin, Firehole River, Wyoming,	1 : 18,000	1500 ft.	1	1871
	Upper Geyser Basin, Firehole River, Wyoming,	1 : 7,200	600 ft.	1	1871
	Parts of Idaho, Montana, and Wyoming,	1 : 633,600	10·0	1	1871
	White Mountain Hot Springs, Gardiner's River,	1 : 19,200	1600 ft.	1	1871
	Yellowstone Lake, Wyoming Territory. Surveyed by Party in charge of F. V. Hayden,	1 : 126,720	2·0	1	1871
	Yellowstone National Park. Surveyed by Party in charge of F. V. Hayden,	1 : 633,600	10·0	1	1871
	Annual Reports of U.S. Geological Survey of the Territories, I.-XII., 1867-78. F. V. Hayden.				
	Div. III.—Geographical and Geological Survey of Rocky Mountain Region.				
	Map of the Territory of Utah. Report on the lands of the Arid Region of the United States, with a more detailed account of the lands of Utah. J. Powell. Washington: Department of the Interior,	1 : 633,600	10·0	1	1879

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. Division III.—*continued.*	Map of the United States, exhibiting the Grants of Lands made by the General Government to aid the construction of Railroads or Wagon Roads, . . .	1 : 6,870,000	108·4	1	1878
	Rain Chart of the United States, . .	1 : 6,870,000	108·4	1	1878
	Topographical and Geological Atlas of the District of the High Plateaus of Utah. By C. E. Dutton, ...	1 : 253,440	4·0	8	1880
	Map showing the Territory originally assigned to the Cherokee Nation of Indians, West of the Mississippi. Also the boundaries of the territory now occupied or owned by them. By C. C. Royce.	1 : 1,140,480	18·0	1	1884
	Map of the former territorial limits of the Cherokee Nation of Indians. By C. C. Royce. Smithsonian Institution. Bureau of Ethnology. J. Powell, Director, 5th Ann. Rep., . . .	1 : 1,140,480	18·0	1	1884
	Map showing the Distribution of Indian Tribes of California, to illustrate Report by Stephen Powers. Vol. III., .	1 : 1,900,800	30·0	1	1877
	Map showing the Distribution of Indian Tribes of Washington Territory. By W. H. Dall. Vol. I. Contribution to American Ethnology, ...	1 : 873,680	13·8	1	1876
	Temperature Chart of the United States. By Ch. Schott, Asst. U. S. Coast Survey, October 1872, ...	1:10,000,000	157·8	1	1872
	Rain Chart of the United States. By Chas. A. Schott, Asst. U. S. Coast Survey, in Aug. 1868, ...	1:10,000,000	157·8	3	1870
	Geological Exploration of the Black Hills.				
	Report on the Geology and Resources of the Black Hills of Dakota, with Atlas. By H. Newton and Walter P. Jenny, .	1 : 253,440	4·0	2	1880
	Map of the Yellowstone National Park, Big Horn Mountains, the Snake River, with adjacent parts of Montana, Idaho, and Wyoming. Report of an exploration of parts of Wyoming, Idaho, and Montana. By P. H. Sheridan, . .	1 : 950,400	15·0		1882
	DIV. IV.—Department of the Interior. (Land Office Maps.)				
	General Map of the United States, . .	1 : 2,534,400	40·0	4	1884
	State of Alabama, ...	1 : 760,320	12·0	1	1882
	State of California, ...	1 : 1,140,480	18·0	2	1879
	State of Colorado, ...	1 : 950,400	15·0	1	1881
	State of Florida, ...	1 : 760,320	12·0	2	1883
	State of Illinois, ...	1 : 887,040	14·0	1	1878
	State of Indiana, ...	1 : 633,600	10·0	1	1878
	State of Iowa, ...	1 : 760,320	12·0	1	1885
	State of Kansas, ...	1 : 950,400	15·0	1	1884
	State of Louisiana, ...	1 : 887,040	14·0	1	1879
	State of Michigan, ...	1 : 1,013,760	16·0	1	1878
	State of Minnesota, ...	1 : 950,400	15·0	1	1884
	State of Mississippi, ...	1 : 760,320	12·0	1	1878
	State of Missouri, ...	1 : 887,040	14·0	1	1878
	State of Nebraska, ...	1 : 950,400	15·0	1	1884
	State of Nevada, ...	1 : 1,013,760	16·0	1	1879
	State of Oregon, ...	1 : 950,400	15·0	1	1884
	State of Wisconsin, ...	1 : 760,320	12·0	1	1878
	Territory of Arizona, ...	1 : 9 0,400	15·0	1	1883
	Territory of Dakota, ...	1 : 1,140,480	18·0	1	1882
	Territory of Idaho, ...	1 : 1,013,7 0	16·0	1	1883
	Indian Territory, ...	1 : 760,320	12·0	1	1885
	Montana Territory.	1 : 1,140,480	18·0	1	1883
	Territory of New Mexico, . . .	1:1,013,760	16·0	1	1882
	Territory of Utah, ...	1 : 950,400	15·0	1	1884
	Washington Territory, ...	1 : 950,400	15·0	1	1883
	Territory of Wyoming, ...	1 : 950,400	15·0	1	1883
	General Land Office: Washington: N. C. M'Farland, Commissioner.				

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. P. O. MAPS—*continued.*	**DIV. V.—Post Office.**				
	ost Route Maps. Published by order of the Postmaster-General, under the direction of C. Roeser, Washington:—				
	State of Maine, ...	1 : 506,880	8·0	1	1883-84
	States of New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and parts of New York and Maine, ...	1 : 380,160	6·0	2	1883-84
	State of New York and parts of Vermont, Massachusetts, Connecticut, New Jersey, Delaware, and Maryland, and of the District of Columbia, . . .	1 : 380,160	6·0	4	1883-84
	States of Pennsylvania, New Jersey, Delaware, and Maryland, and of the District of Columbia, ...	1 : 380,160	6·0	4	1883-84
	States of Virginia and West Virginia, together with Maryland and Delaware, with adjacent parts of Pennsylvania, Ohio, Kentucky, Tennessee, and North Carolina, ...	1 : 633,600	10·0	4	1883-84
	States of South Carolina and Georgia, with adjacent parts of North Carolina, Tennessee, Alabama, and Florida, .	1 : 633,600	10·0	2	1883-84
	States of North Carolina and South Carolina, with adjacent part of Georgia, Tennessee, Kentucky, West Virginia, and Virginia, ...	1 : 506,880	8·0	4	1883-84
	State of Florida with adjacent parts of Georgia and Alabama, also the neighbouring West Indian Islands, . .	1 : 887,040	14·0	2	1883-84
	States of Kentucky and Tennesse, with parts of adjacent States, . . .	1 : 506,880	8·0	4	1883-84
	States of Alabama and Mississippi with adjacent parts of Florida, Georgia, Tennessee, Arkansas, and Louisiana, .	1 : 633,600	10·0	2	1883-84
	State of Texas with adjacent parts of Louisiana, Arkansas, Indian Territory, and of the Republic of Mexico, . .	1 : 887,040	14·0	2	1883-84
	States of Louisiana with adjacent parts of Mississippi, Arkansas, and Texas, .	1 : 506,880	8·0	2	1883-84
	State of Arkansas and the Indian Territory, with adjacent portions of Mississippi, Tennessee, Missouri, Kansas, Texas, and Louisiana, . . .	1 : 633,600	10·0	2	1883-84
	States of Ohio and Indiana, with adjacent parts of Pennsylvania, Michigan, Illinois, Kentucky, and West-Virginia,	1 : 506,880	8·0	2	1883-84
	States of Illinois, Iowa, and Missouri with adjacent parts of Indiana, Wisconsin, Minnesota, Nebraska, Kansas, and Arkansas, ...	1 : 633,600	10·0	4	1883-84
	States of Michigan and Wisconsin, with adjacent parts of Ohio, Indiana, Illinois, Iowa, and Minnesota, . . .	1 : 633,600	10·0	2	1883-84
	State of Minnesota, with adjacent parts of Iowa, Nebraska, Dakota, Wisconsin,	1 : 633,600	10·0	2	1883-84
	State of Kansas and Nebraska, with adjacent parts of Missouri, Iowa, Dakota, Colorado, Texas, and Indian Territory, ...	1 : 633,600	10·0	4	1883-84
	State of Colorado, ...	1 : 570,240	9·0	1	1883-84
	States of California and Nevada, . .	1 : 760,320	12·0	2	1883-84
	State of Oregon and Territory of Washington, ...	1 : 633,600	10·0	2	1883-84
	Territories of New Mexico and Arizona, with parts of adjacent states and territories, ...	1 : 887,040	14·0	2	1883-84
	Territory of Utah, with parts of the adjacent states and territories, . .	1 : 633,600	10·0	1	1883-84
	Territories of Montana, Idaho, and Wyoming with parts of adjacent states and territories, ...	1 : 950,400	15·0	2	1883-84
	Territory of Dakota, with adjacent parts of Montana, Wyoming, Nebraska, Iowa, and Minnesota, ...	1 : 633,600	10·0	2	1883-84

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS—*continued.*	**DIV. VI.—War Department.** (Corps of Engineers.)				
	I.—Survey of the Northern and North-Western Lakes.				
	Charts of the Survey of the Northern and North-Western Lakes. Engineer Department, U.S. Army, . .	Scale from 1 : 5,000 to 1 : 600,000	0·07 to 9·4	79	1841-81
	II.—Explorations and Surveys West of the Mississippi River.				
	A.—General Maps.				
	Military Map of the United States,* .	1 : 5,000,000	78·9	4	1877
	Geographical Map of the United States, .	1 : 5,000,000	78·9	4	1885
	New Map of the Territory of the United States West of the Mississippi River, .	1 : 2,000,000	31·5	4	1884
	Map of the United States showing the Location of Works and Surveys for River and Harbour Improvements. By R. M. Robert, ...	1 : 3,326,400	52·5	4	1881
	B.—District Maps.				
	1. Military Division of the Pacific.				
	Map of a portion of South-Eastern Arizona. By E. C. Spencer, ...	1 : 506,880	8	1	1886
	Map of the Territory of Arizona. By Theodore Bingham, ...	1 : 633,600	10	1	1885
	Map of North-Eastern New Mexico. By John E. Green, ...	1 : 456,000	7·2	1	1885
	Map of South-Eastern New Mexico. By O. M Carter, ...	1 : 456,000	7·2	1	1883
	Map of the Department of the Columbia. By T. W. Symons, ...	1 : 1,013,760	16	1	1882
	Map of Oregon, Washington, and Idaho,	1 : 1,500,000	23·6	1	1880
	Map of California and Nevada. . .	1 : 1,500,000	23·6	1	1880
	Map of New Mexico and Arizona, . .	1 : 1,500,000	23·6	1	1880
	Map of the Arizona Territory, . .	1 : 1,140,600	18	1	1880
	Map of the Department of Arizona, .	1 : 380,160	6	5 publ.	1879
	2. Military Division of the Missouri.				
	Map of the United States and Texas Boundary Line, determined and surveyed in 1857-60. By J. H. Clark, .	1 : 1,000,000	15·7	1	1886
	Preliminary Sketches of Sheets of the Survey of Western Texas. By W. R. Livermore, ...	1 : 253,440	4	12 publ.	1886
	Map of the Department of Dakota. By John Biddle, ...	1 : 1,500,000	23·6	1	1886
	Military Map of South-Eastern Texas. By W. R. Livermore, ...	1 : 1,013,760	16	1	1885
	Military Map of Western Texas. By W. R. Livermore, ...	1 : 1,013,760	16	1	1885
	Map of the Military Department of the Missouri. By P. M. Carter, . .	1 : 1,013,760	16	1	1884
	Map of Nebraska. By W. T. Stanton, .	1 : 633,600	10	1	1882
	Map of the Yellowstone National Park, Big Horn Mountains, and adjacent Territory, ...	1 : 760,320	12	1	1881
	Map of Colorado, ...	1 : 1,500,000	23·6	1	1880
	Map of the Yellowstone and Missouri River and their Tributaries. By G. L. Gillespie, ... *Engineer Department U.S. Army.*	1 : 1,200,000	18·9	1	1877
	III.—Mississippi River Commission.				
	Atlas of the Mississippi. Washington, .	..	..	..	1887
	Map of the Arkansas River from Little Rock to its Mouth, ...	1 : 28,800	0·4	22	1886

* The Engineer Department keeps these Maps constantly revised.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. Division VI.—*continued.*	Map of the Mississippi River from Lake Itasca to the Falls of St. Anthony. By Ch. Allen, ...	1 : 63,360	1	17	1882
	Maps of the Yellowstone River from Fort Keogh to Fort Buford. By Ed. Maguire, ...	1 : 9,600	0·13	33	1881
	Survey of the Mississippi River. By C. B. Comstock and E. H. Ruffner, .	1 : 63,360	1	16	1879-85
	Map of the White River. By J. A. Smith, ...	..	..	17	1879
	Map of the Mississippi River between the Illinois and Ohio Rivers. From Surveys by W. F. Raynolds and J. H. Simpson, ...	..	..	9	1878
	Maps illustrating a Reconnaissance of the Mississippi River from Cairo to New Orleans, ...	1 : 63,360	1	32	1876
	IV.—Geological Exploration of the 40th Parallel. By Clarence King.				
	Atlas of Geological Exploration of 40th Parallel. By Clarence King, . .	1 : 253,440	4	5	1867-85
	Geological, *Engineer Department U.S. Army.*	1 : 253,440	4	5	1867-85
	Atlas on Mining Industry. By Clarence King. Maps, ...	various	..	7	1870
	Do. do. Sections, etc.,	..	..	7	1870
	V.—Geographical Surveys West of the 100th Meridian. G. Wheeler.				
	Topographical Atlas of Territory of the United States West of the 100th Meridian. By G. M. Wheeler, . . .	1 : 253,440 1 : 506,880	4 8	35 15	1875-81 1875-81
	Do. do. Geological, Office of Geographical Surveys under Engineer Department.	1 : 506,880	8	11	1875-81
	VI.—Boundary Commission Maps.				
	Joint Maps of the Northern Boundary of the United States, from Lake of the Woods to the Summit of the Rocky Mountains. U.S. Northern Boundary Commission: A. Campbell, W. J. Twinning. Her Majesty's North American Boundary Commission: D. R. Cameron, L. Anderson, . . .	1 : 126,720	2	24	1878
	Map of the Vicinity of the North-West Point of the Lake of the Woods, . .	1 : 380,160	6	1	1878
	Reconnaissance Maps showing the General Features of the Topography adjacent to the 49th Parallel from the Lake of the Woods to the Rocky Mountains. U.S. Northern Boundary Commission: A. Campbell, Commissioner, ...	1 : 506,880	8	6	1878
	Div. VII.—Separate State Surveys. (*With Miscellaneous Maps*).				
ARKANSAS.	Map of South-Western Arkansas. By T. Hill, ...	1 : 202,752	3·2	1	1888
	Map of the Coal Region, ...	1 : 63,360	1	4	1888
CALIFORNIA.	Preliminary Geological and Mineralogical Map of California. California State Mining Bureau, ...	1 : 760,320	12	4	1891
	Map of the Forest Hill Divide, . .	1 : 31,680	0·5	2	1890
	Geological Map of Mother Lode Region,	1 : 63,360	1	1	1890
	Geological Map of Iowa Mining District (Placer County), ...	1 : 19,200	1600 ft.	1	1890
	Map of California and Nevada. State Geol. Survey: J. D. Whitney. San Francisco: W. D. Walkup & Co., . .	1 : 1,140,480	18	1	1887
	Topographical Map of Central California, together with a part of Nevada. State Geol. Survey: J. D. Whitney, . .	1 : 380,160	6	4 (?)	1877

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. CALIFORNIA—*continued.*	Map of a part of Southern California. By Horoland and Koeberle, Los Angeles,	1 : 253,440	4	1	1886
	Counties.				
	Alameda, Contra Costa,	1 : 31,680	0·5	2	1874, 85
	Colusa, San Mateo,	1 : 40,000	0·6	2	1885, 77
	Amador, Sacramento, Solano,	1 : 50,000	0·7	3	1881, 85, 1872
	Butte, Marin, Merced, Napa, San Joaquin, Shasta Valley, Stanislaus, Sutter, Tuolumne, Yuba,	1 : 63,360	1	11	1861-86
	Nevada,	1 : 80,000	1·2	1	1880
	Sierra,	1 : 95,040	1·5	1	1874
	Humboldt, Mendocino, Monterey, San Luis Obispo, Santa Clara, Siskiyou, Sonoma, Tulare,	1 : 126,720	2	8	1877-87
	Fresno, Kern, San Joaquin Valley (4),	1 : 190,080	3	6	1875-86
	Inyo, Plumas,	1 : 253,440	4	2	1884-86
	Los Angeles,	1 : 380,160	6	1	1885
	Atlas of the City and County of San Francisco. By Humphreys,	..	..	63	1876
	Topographical Map of Yosemite Valley. By Geo. M. Wheeler,	1 : 42,240	0·6	1	1883
	Map of a portion of the Sierra Nevada adjacent to the Yosemite Valley. By C. F. Hoffmann and J. T. Gardner,	1 : 126,720	2	1	1867
	Atlas to accompany a Monograph on the Geology of the Quicksilver Deposits of the Pacific Slope. By G. F. Becker:—				1887
	Geological Map of the Clear Lake District,	1 : 95,040	1·5	1	
	Geological Map of the Sulphur Bank District,	1 : 15,000	1250 ft.	1	
	Geological Map of the Knoxville District,	1 : 15,000	1250 ft.	1	
	Topographical Map of the Region of Clear Lake,	1 : 95,040	1·5	1	
	Geological Map of the New Indria District,	1 : 15,000	1250 ft.	1	
	Geological Map of the New Almaden Mining District,	1 : 15,000	1250 ft.	1	
	Ore Bodies and Topography of Mine Hill, New Almaden,	1 : 3,600	300 ft.	1	
	Plan of New Almaden,	1 : 1,800	150 ft.	1	
	Plan of the Clays of New Almaden,	1 : 1,800	150 ft.	1	
	Steam-Boat Spring, Nevada,	1 : 15,000	1250 ft.	1	
COLORADO.	Atlas to accompany a Monograph on the Geology and Mining Industry of Leadville Colorado. By S. F. Emmons:—				1883
	Central Colorado,	1 : 250,000	3·9	1	
	Topographic Map of Mosquito Range,	1 : 63,360	1·0	1	
	Geological Map of Mosquito Range,	1 : 63,360	1·0	1	
	Topographic Map of Leadville and Vicinity,	1 : 1,920	800 ft.	2	
	Geological Map of Leadville and Vicinity,	1 : 9,600	800 ft.	2	
	Atlas to accompany the Tertiary History of the Grand Cañon District. By Cl. E. Dutton:—				1882
	Geological Map of the Western Part of the Plateau Province,	1 : 1,013,760	16·0	1	
	Sketch Map of the Western Part of the Plateau Province, showing the Faults of the Grand Cañon District and High Plateaus,	1 : 1,013,760	16·0	1	
	Map of the Unikart Plateau,	1 : 63,360	1·0	2	
	Geological Map of the Southern Part of the Kaibab Plateau,	1 : 63,360	1·0	4	
	Geological Map showing the South-Western Portion of the Mesozoic Terraces and the vicinity of the Hurricane Fault,	1 : 253,440	4·0	1	

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
United States. SPECIAL MAPS. COLORADO—*continued.*	Geological Map of the Mesozoic Terraces of the Grand Cañon District and the Southern portions of the High Plateaus, ...	1 : 253,440	4·0	1	
	Geological Map of the Kanab, Kaibab, Paria, and Marble Cañon Platforms, .	1 : 253,440	4·0	1	
	Geological Map of the Colorado and San Francisco Mts., ...	1 : 253,440	4·0	1	
	Atlas to accompany the Geology of the Comstock Lode and the Washoe District. By G. F. Becker:—				1882
	Maps of the Washoe District, Geological and Mining Claims, ...	1 : 18,000	1500 ft.	2	
	Nell's new Topographical and Township Map of the State of Colorado. Denver: Stone & Co., ...	1 : 675,000	10·6	1	
	L. Nell. Topographical and Township Map of part of the State of Colorado, .	1 : 570,240	9·0	1	
	White River, Indian Reservation. Washington, ...	1 : 570,240	9·0	1	1880
FLORIDA.	Map of Florida. By Williams & Bushnell, Jacksonville, ...	1 : 250,000	3·9	..	188
KENTUCKY.	County Maps of Kentucky. Topography, by J. B. Hoeing, ...	1 : 126,720	2·0	..	1886
	Preliminary County Map of Kentucky, .	1 : 1,267,200	20·0	1	1887
	Geological Map of Kentucky, . . .	1 : 1,267,200	20·0	1	1887
	Preliminary Map of South-Eastern Kentucky, ...	1 : 316,800	5·0	1	1886
	Agricultural Map of the Jackson Purchase, ...	1 : 300,000	4·7	1?	1886
MICHIGAN.	Geological Survey of Michigan. With an Atlas.				
MONTANA.	Official Map of the Territory of Montana. By W. P. Snow, ...	1 : 950,400	15·0	2	1886
NEW HAMPSHIRE.	Atlas of New Hampshire. Geological Survey of New Hampshire, . . .	1 : 158,400	2·5	..	1874
	Map of the White Mountains. Appalachia: Journal of the Appalachian Club,	1 : 100,000	1·5	1	1887
NEW JERSEY.	Atlas of New Jersey. Geological Survey of New Jersey, ...	1 : 63,360	1·0	17	1882
	Map of the State of New Jersey, Geographical, ...	1 : 316,800	5·0	1	1882
	Map of the State of New Jersey, Hysometrical, ...	1 : 316,800	5·0	1	1882
	Map of the State of New Jersey, Geological, ...	1 : 316,800	5·0	1	1882
	Map of the Thoroughfare running back of the Ocean between Cape May and Great Bay. By L. Y. Schermerhorn,	1 : 84,480	1·01	1	1888
N. CAROLINA.	Map of North Carolina, ...	1 : 633,600	10·0	1	1882
NEW YORK.	Map of the Catskill Mountains. By A. Guyot. New York: Ch. Scribner and B. Westermann, ...	1 : 190,080	3·0	1	1880
OHIO.	Geological Atlas of the State of Ohio. By J. L. Newberry. Published by authority of the Legislature. Cincinnati, ...	..	..	6	1879
PENNSYLVANIA.	A Geological Hand-Atlas of the 61 Counties of Pennsylvania, embodying the Results of the Field-work of the Survey from 1874-84. By J. P. Lesley, . .	1 : 380,160	6·0	61	1885
	Grand Atlas, Div. 1.				
	County Maps, ...	1 : 126,720	2·0	51	1885
		1 : 59,040	1·5	4	1885
		1 123,299	1·9	1	1885
	Grand Atlas, Div. 2. Part 1. Anthracite Coalfields.				
	Western Middle and Southern Fields in Carbon, Schuylkill, Columbia, and Northumberland Counties, . . .	..	..	26	1884

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
United States. SPECIAL MAPS. PENNSYLVANIA —*continued.*	A Preliminary General Map of the Anthracite Coalfields and adjoining Counties of Pennsylvannia,	1 : 300,000	4·7	1	1884
	Topographical Sheets,	1 : 19,200	1600 ft.	..	1884
	Grand Atlas, Div. 2. Part 2. Northern and Eastern Middle Fields in Luzerne County,	..	..	22	1885
	General Map,	1 : 300,000	4·7	1	1885
	Grand Atlas, Div. 3. Part 1. Petroleum and Bituminous Coal Fields. Map of Oil Region of W. Pennsylvania,	..	..	32	1885
	And South-Western New York,	1 : 380,160	6·0	1	1885
	Maps,	..	..	15	1885
	Grand Atlas, Div. 4. Part 1. South Mountain and Great Valley Topographical Maps. Durham and Reading Hills and Bordering Hills and Valleys in Northampton, Lehigh, Bucks, and Berks Counties,	1 : 19,200	1600 ft.	29	1885
	Geological Index Maps,	1 : 126,720	2·0	1	1885
	South Mountains in Adams, Franklin, Cumberland, and York Counties,	1 : 19,200	1600 ft.	12?	1885
	Index Map,	1 : 126,720	2·0	1	1885
	Pennsylvania Second Geological Survey. Oil and Gas Fields of Western Pennsylvania. By F. Call,				
	Map of Western Pennsylvania and contiguous portions of New York, Ohio, and W. Virginia, showing the General Outlines of Oil and Gas producing Areas. By E. B. Harden,	1 : 380,160	6·0	1	1891
	Atlas Northern Anthracite Fields. Part 1,	1 : 9,600	800 ft.	6	1885
	,, ,, ,, ,, Part 2,	1 : 9,600	800 ft.	6	1888
	,, ,, ,, ,, Part 3,	1 : 9,600	800 ft.	4	1889
	,, ,, ,, ,, Part 4,	1 : 9,600	800 ft.	8	1889
	,, ,, ,, ,, Part 5,	1 : 4,800	400 ft.	7	1889
	Atlas Eastern Middle Anthracite Fields. Part 1,	1 : 9,600	800 ft.	2	1885
	Atlas Eastern Middle Anthracite Fields. Part 2,	1 : 9,600	800 ft.	6	1888
	Atlas Eastern Middle Anthracite Fields. Part 3,	1 : 9,600	800 ft.	8	1889
	Atlas Western Middle Anthracite Fields. Part 1. Topographical Sheets,	1 : 19,200	1600 ft.	3	1884
	Mining Sheets,	1 : 9,600	800 ft.	4	1884
	Atlas Western Middle Anthracite Fields. Part 2,	1 : 9,600	800 ft.	4	1887
	Atlas Southern Anthracite Fields. Vol. I. General Map of the Anthracite Fields,	1 : 300,000	4·7	1	1882
	Topographical Map of the Panther Creek Coal Basin in Carbon and Schuylkill Counties,	1 : 19,200	1600 ft.	1	1882
	Panther Creek Basin,	1 : 9,600	800 ft.	3	1882
	Atlas of Cambria and Somerset County,	1 : 126,720	2·0	..	1888
	Atlas of Bucks and Montgomery Counties,	1 : 19,200	1600 ft.	12	1889
	Grand Atlas, Div 5. Central and South-Eastern Pennsylvania, The Topography and Geology of the Palæozoic Strata :—			35	1885
	(*A.*) Topographical and Geological Sheets,	1 : 96,000	8000 ft.	1	1885
		1 : 19,200	1600 ft.	14	1885
		1 : 9,600	800 ft.	2	1885
	(*B.*) Sheets relating to parts of Huntingdon, Miffin, Centre and Union Counties,	1 : 19,200	1600 ft.	3	1885
		1 : 126,720	2·0	1	1885
		1 : 39,600	3300 ft.	1	1885
	(*C.*) Sheets relating to South-Eastern Pennsylvania,	1 : 19,200	1600 ft	3	1885
WISCONSIN.	Atlas of Wisconsin. By T. C. Chamberlin,	..	..	42	1882
	Geological Map of Wisconsin. Geological Survey of Wisconsin,	1 : 950,400	15·0	1	1882

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
	POPULAR RAILWAY MAPS.				
	The Pocket Series of State Maps published by *Messrs. Rand, M'Nally & Co. of Chicago*, although of little value for geographical accuracy, are useful as being generally revised to date and showing the latest railways, townships, and counties. The larger-scaled Sectional Maps issued by the same firm are also useful for general reference.				
ALASKA.	*The Chilicat Country. Proceedings of the Royal Geogr. Society,*	1 : 633,600	10	1	1891
	Map of Alaska. By A. and H. Lindenkohl. U. S. Coast and Geodetic Survey,	1 : 3,600,000	56·8	1	1890
	Yahtse-Tah-Shah or Mt. St. Elias. By Harold W. Topham. Proceedings of the Royal Geogr. Society, ...	1 : 253,440	4	1	1889
	Bering Strait. 1853. Price 1s. 6d. Admiralty Chart, ...	1 : 73,037	1·0	1	1889
	Map of Alaska and adjoining Territories. By Ivan Petroff. U. S. Census, viii.	1 : 3,500,000	55·2	1	1888
	Map of Alaska, Southern Part. Proceedings of the Royal Geogr. Society, . .	..	..	1	1887
	Report of an Expedition in the Territory of Alaska. By H. T. Allen. Washington,	1 : 950,400 1 : 253,440	15 4	1 5	1887 1887
	Alaska and adjoining Territories. By W. H. Dall. Washington: U. S. Coast and Geodetic Survey, ...	1 : 2,900,000	45·7	1	1885
	Map of Explorations in North-Western Alaska, under the direction of W. B. Hazen. By T. H. Ray, ...	1 : 1,520,640	24	1	1885
	Yukon River. Report of a Military reconnaissance in Alaska, made in 1883. By Fr. Schwatka. Washington, . .	1 : 285,120	4·5	20	1885
	Pacific Coast Pilot, Alaska. By W. H. Dall. U. S Coast and Geodetic Survey. Washington, ...	1 : 506,880	8	15	1883
	Kurte des Tchilikat Gebietes mit den Pässen zum Yukon. Von Arthur Krause. Zeitschrift d. Gesell. f. Erdkunde. Berlin: Dietrich Reimer, ...	1 : 500,000	7·8	1	1883
	Northern Alaska. From a Survey by E. W. Nelson, 1878-79. Proceedings of the Royal Geogr. Society, ...	1 : 1,650,000	26·04	1	1882
	Alaska. Drawn under the direction of W Dall. Washington: U.S. Coast and Geodetic Survey, ...	1 : 4,800,000	75·7	1	1869
	The Yukon River. By Capt. Raymond and Ev. Diezelski. Washington: Office of the Chief of Engineers, . . .	1 : 1,000,000	15·7	1	1871
	Territorium Alaska. Von A. Petermann. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes, ...	1 : 9,000,000	142·4	1	1869
MEXICO.	Carta General de la Republica Mexicana, formada en el Ministerio de Fomento con los datos mas recientes por disposicion del Secretario del Ramo General Carlos Pacheco. Price £2, 12s.	1 : 2,000,000	31·5	4	1890
	Carta de la Republica Mexicana. Mexico, Secretaria de Fomento, ...	1 : 100,000	1·5	3 pub.	1890
	General Map of the Republic of Mexico. By Gen. Conde. Engraved from Original Survey of Mexican Government. Price 10s. 6d. London: E. Stanford, . .	1 : 4,055,000	64	1	..
	*Carta Minera de la Republica Mexicana. Formada por disposicion del Secretario de Fomento Gral. Carlos Pacheco por el Ingeniero de Minas Antonio del Castillo. Price 15s., ...	1 : 3,000,000	47·3	1	1890

* Seven other Maps are published: Hypsometrical, Land Surface Features, Climate, Maize, Wheat, Coffee and Tobacco, Cotton.

Country.	Title of Map.	Scale. Natural Scale.	Scale. Miles to Inch.	Total Number of Sheets.	Date.
Mexico.—*continued.*	Bosquejo de una Carta geologica de la Republica Mexicana formada por disposicion del Secretario de Fomento Gral. Carlos Pacheco por una Comision especial, bajo la direccion del Profesor Antonio del Castillo, director de la Escuela National de Ingenieros. Price £1, 10s.,	1 : 3,000,000	47·3	1	1889
	Etats Unis du Mexique. Première partie par F. Bianconi et Louis de Balestrier. Price 3s. 4d. *Paris: Chaix,*	1 : 3,000,000	47·3	2	1889
	Mexico, Johnston's Royal Atlas Map. Price 3s. *Edinburgh: W. & A. K. Johnston,*	1 : 5,480,000	86	1	1889
	Der Staat Sinaloa in Mexiko. Petermann's Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 500,000	7·8	1	1884
	Carta General de los Estados Unidos Mexicanos formada en el Departamento de Cartografia con los datos mas recientes de orden del oficial Major de la Secretaria de Fomento Manuel Fernandez bajo la direccion del Ingeniero I. Molino court. y dibuj. M. C. Castro y R. Tangassi,	1 : 3,000,000	47·3	1	1883
	Voyage Archéologique au Mexique. Par M. D. Charnay. Bull. Soc. Geogr., Paris,	1 : 500,000	7·8	1	1882
	Carta topogr. de los alrededores de Puebla. Mexico,	1 : 20,000	0·3	9	1881
	Karte der Halbinsel Yucatan. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 1,600,000	25·2	1	1879
	Mapa de la peninsula de Yucatan. Por J. Hübbe, & A. Perez. Paris: Regnier,	..	..	5	1878
	Rio Mexcala (Balsas). R. B. Gerusch and Fr. Zimenez. Cosmos,	1 : 500,000	7·8	1	1878
	Orizaba (Citlactepetl). Cosmos,	1 : 100,000	1·5	1	1878
..	*G. Dewys Aufnahme der Kalifornischen Halbinsel und der Merikanischen Küsten. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes,*	1 : 3,500,000	55·2	1	1875
CENTRAL AMERICA.	Carte du Mexique. Par M. Niox. Dressée au Dépôt de la Guerre. Paris,	1 : 3,000,000	47·3	1	1875
	Mapas de Colton America Central. Publicados por D. Appleton y Compania. Nueva York. Price £1, 11s. 6d.,	1 : 1,705,000	26·9	2	1889
	Central America from Original Surveys. By Trelawney Saunders. Price 7s. 6d. London: E. Stanford,	1 : 2,154,200	34	1	..
	Zentral America. 3 Von A. Petermann, Stieler's Hand-Atlas. Gotha: Justus Perthes,	1 : 7,500,000	118	4	1890
GUATEMALA.	*Republique du Guatemala. Par F. Bianconi et Medina.* Price 4 fr. *Paris: Chaix,*	1 : 750,000	11·8	1	1890
	Mapa de Republica de Guatemala. Theodoro Paschke, Guatemala	1 : 1,200,000	18·9	1	1889
	Karte von Guotemala. Leipzig: F. A. Brockhaus,	1 : 1,472,000	27·4	1	1886
	Map of Guatemala. *Proceedings of the Royal Geogr. Society,*	1 : 1,457,280	23·0	1	1883
	Plano topografico de una parte de los linderos provisionales entre las republicas de Guatemala y Mexico conforme a la convencion del año 1877. M. V. Hippel,	1 : 60,000	0·9	1	1877
SAN SALVADOR.	*Mapa politico escolar y telegrafico de la Republica del Salvador. San Salvador: G. Dawson,*	1 : 333,333	5·2	2	1887
BRITISH HONDURAS.	*Map of British Honduras. By A. Usher. London: F. S. Weller,*	1 : 385,000	6·07	1	1891

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
Central America.					
BRITISH HONDURAS—*continued.*	*Report of the Expedition to the unexplored Coxcomb Mountains. By H. E. H. Jerningham. Belize,*	1 : 126,720	2·0	1	1888
	Plan of portion of the Western Frontier of British Honduras. Proceedings of the Royal Geogr. Society,	1 : 570,240	9·0	1	1887
HONDURAS.	*Mapa de la Republica de Honduras. A. T. Byrne. New York: Colton & Co.,*	1 : 1,000,000	15·7	1	1886
NICARAGUA.	*Pläne und Profile des Nicaragua Schiffskanals. Von R. E. Peary. Deutsche Geogr. Blätter. Bremen: G. A. von Halem,*	1 : 186,500	2·9	1	1889
	Spezialkarte des Nicaragua Kanales. Nach der Karte der V. S. Vermessungs Expedition unter A. G. Menocal. Petermanns Geogr. Meitteilungen. Gotha: Justus Perthes,	1 : 600,000	9·4	1	1887
COSTA RICA.	*Prov. Talamanca. Prof. C. Borallius. Ymer,*	1 : 500,000	7·8	1	1885
	Mapa de la republica de Costa Rica. F. Montesdeoca. Paris: Erhard,	1 : 1,000,000	15·7	1	1883
	Hauptgebiet von Costa Rica. Nach Gabb, Collins und Martinez. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 600,000	9·4	1	1877
	Costarica Von v. Frantzius. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 1,000,000	15·7	1	1869
	Der Nordwestliche Theil von Costa Rica zur Uebersicht der Reisen von K. von Seebach. Petermanns Geogr. Mitteilungen. Gotha: Justus Perthes,	1 : 600,000	9·4	1	1865
ISTHMUS OF DARIEN, COLOMBIA.	*Plan topogr. de la région du Canal. Paris: Soc. Univers. du Canal,*	1 : 50,000	0·7	6	1887
	Also in *Bull Soc. Géogr. Paris,*	1 : 750,000	11·8	1	1885
	Course du Bayano, du Mamoni, du Terrable et de L'Icanti. Par L. Wyse,	1 : 275,000	4·3	1	1879
	Colombia, Map of the Rio Sinu from Survey by F. A. A. Simons. Price 5s. London: E. Stanford,	1 : 212,000	3·3	1	..
	Carte du Darien Méridionale. Par L. Wyse. Bull. Soc. Géogr. Soc., Paris,	1 : 250,000	3·9	1	1877
WEST INDIES.	West India Islands and Caribbean Sea. Price 7s. Admiralty Chart,	1 : 2,191,111	naut. 30	3	1889
	West Indien. Von A. Petermann. Stieler's Hand-Atlas. Gotha: Justus Perthes,	1 : 7,500,000	118	4	1890
BAHAMA AND ABACO ISLANDS.	Bahama and Abaco Island, with the North East Providence Channel. Price 2s. 6d. Admiralty Chart,	1 : 365,183	nautic. 5·0	1	1889
	Bahamas, Stanford's London Atlas Map with insets. Price 3s. London: E. Stanford,	nautic.	..	..	..
BERMUDAS.	*Bermudas Topographical Map, published under direction of the Governor, Major-Gen. Lefroy. London: E. Stanford,*	1 : 25,000	2·5	4	..
CUBA.	Cuba, eastern portion. Price 2s. 6d. Admiralty Chart,	1 : 730,366	nautic. 10·0	1	1889
	Cuba, western portion. Price 2s. 6d. Admiralty Chart,	1 : 730,366	nautic. 10·0	1	1887
	Gran Carta Geografica Encyclopedica de la Isla de Cuba. G. G. de las Penas. Madrid: Murillo,	1 : 775,000	12·2	1	1881
JAMAICA.	*Jamaica, Stanford's London Atlas Map. Price 3s. London: E. Stanford,*	1 : 418,176	6·6	1	1889
	Map of Jamaica, prepared from the best authorities by order of His Excellency Sir Henry Wyllie Norman. Prepared in the Public Works Department by Colin Lidell. Price 16s. Kingston, *London: E. Stanford,*	1 : 175,000	2·7	2	1888
	Jamaica. Price 2s. 6d. Admiralty Chart,	1 : 365,183	nautic. 5·0	1	1888

Country.	Title of Map.	Scale.		Total Number of Sheets.	Date.
		Natural Scale.	Miles to Inch.		
West Indies.—*continued*	Grand and Lesser Caymans. Price 2s.	1 : 73,037	1·0		
	Admiralty Chart, ...	1 : 24,346	0·33	2	1880-81
GRAND & LESSER CAYMANS.	*Ile d'Haiti. Par D. Fortunat. Paris,* .	1 : 400,000	6·3	4	1888
HAITI.	*Croquis des Weges von Jarabacoa bis Pico del Valle. Von Baron H. Eggers. Petermanns Geogr. Mitteilungen. Gotha : Justus Perthes,*	1 : 250,000	3·9	1	1887
	Die Insel Haiti. Von A. Petermann. Petermanns Geogr. Mitteilungen. Gotha : Justus Perthes, ...	1 : 100,000	1·5	1	1874
PUERTO RICO.	*Puerto Rico. Stielers Hand-Atlas. Gotha : Justus Perthes,*	1 : 2,000,000	31·5	..	1889
	Mapa topografico de isla de Puerto Rico. Nueva York : Colton & Co., . . .	1 : 250,000	3·9	1	1886
	Mona, ...	1 : 58,000	0·9	1	1878
	Culebra, ...	1 : 24,500	0·3	1	1878
	West Virginia Island, ...	1 : 420,000	6·6	1	1878
	Bul. Soc. Geogr. Madrid.				
LEEWARD ISLANDS.	*Leeward Islands. Stanford's London Atlas Map. Price 3s. London : E. Stanford,*	1 : 887,040	14	1	1889
VIRGIN ISLANDS.	Anguilla to Puerto Rico with the approaches to Virgin Islands. Price 2s. 6d. Admiralty Chart, . . .	1 : 365,183	5·0	1	1883
SANTA CRUZ ISLAND.	Santa Cruz Island. Price 3s. Admiralty Chart, ...	1 : 60,864	0·83	1	1874
ANGUILLA, ST. MARTIN, ST. BARTHOLOMEW.	Anguilla, St. Martin, and St. Bartholomew Islands. Price 1s. 6d. Admiralty Chart, ...	1 : 182,591	2·4	1	1886
ST. MARTIN.	*St. Martin. Tijdschr. v. h. Aardr. Genootschap,*	1 : 42,000	0·6	1	1883
SOMBRERO ISLAND.	Sombrero Island. Price 6d. Admiralty Chart, ...	1 : 15,540	nautic. 0·21	1	1874
	St. Christopher, a Topographical Map of the Island. By W. M'Mahon. Price 16s. London : E. Stanford, ...	1 : 12,672	5	4	..
ST. CHRISTOPHER & NEVIS.	St. Christopher and Nevis, Eustatius and Saba. Price 2s. 6d. Admiralty Chart, ...	1 : 60,864	0·83	1	1874
MONTSERRAT.	Montserrat. Price 2s. 6d. Admiralty Chart, ...	1 : 36,518	0·5	1	1867
BARBUDA ISLAND.	Barbuda Island. Price 1s. 6d. Admiralty Chart, ...	1 : 56,182	0·78	1	1880
ANTIGUA.	Antigua. Price 2s. 6d. Admiralty Chart, ...	1 : 48,691	0·66	1	1889
DOMINICA.	Dominica. Price 2s. 6d. Admiralty Chart, ...	1 : 81,252	1·11	1	1872
GUADELOUPE AND MARTINIQUE.	*Guadeloupe, Martinique. Stielers Hand-Atlas. Gotha : Justus Perthes,* . .	1 : 2,000,000	31·5	..	1889
	Carte de la Guadeloupe et dépendances. Paris : Challamet, ...	..	..	1	1880
	Guadeloupe with the adjacent Islands. Saintes, Marie-Galante, Désirade. Price 2s. Admiralty Chart, ...	1 : 146,073	nautic. 2·0	1	1886
	Martinique. Price 3s. Admiralty Chart,	1 : 81,252	1·11	1	1883
WINDWARD ISLANDS.	*Windward Island, Stanford's London Atlas Map. Price 3s. London : E. Stanford,*	1 : 887,040	14	1	1889
SANTA LUCIA.	Santa Lucia. Price 2s. 6d. Admiralty Chart, ...	1 : 73,037	1·0	1	1888
ST. VINCENT.	St. Vincent. Price 1s. 6d. Admiralty Chart, ...	1 : 73,037	1·0	1	1863
BARBADOS.	*Barbados, a Topographical Map. By Sir R. Schomburgk Based on Major's Survey. Price 21s. London : E. Stanford,* . .	1 : 31,680	2	2	..
	Barbados. Price 2s. 6d. Admiralty Chart, ...	1 : 48,691	0·66	1	1886
GRENADA.	Grenada Island. Price 3s. 6d. Admiralty Chart, ...	1 : 73,037	1·0	1	1878
TOBAGO.	Tobago Island. Price 2s. 6d. Admiralty Chart, ...	1 : 73,037	1·0	1	1876
TRINIDAD.	*Trinidad, Stanford's Map from the Surveys of J. Busanta, Surveyor-General. Price 3s. London : E. Stanford,* . . .	1 : 253,440	4	1	1889
	Trinidad Island and Paria Gulf. Price 5s. Admiralty Chart, ...	1 : 146,073	2·0	2	1889

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

ASIA.

The Indian Surveys, 1890.—One of the most important tracts surveyed last year is the Kyaukse district in Burma, which is separated from the Mandalay district on the north by the fine Myit Nge River. A survey party accompanied Mr. Ney Elias, who was deputed to demarcate the Anglo-Siamese boundary, and mapped 9,620 square miles on the quarter-inch scale along the lower course of the Salween. The expedition to the Chin-Lushai country afforded another opportunity of mapping a remote region. Two columns, advancing one from Chittagong and the other from the Myit Tha valley, converged upon the mountainous country to the south of Manipur. A chain of triangles was run through eastwards to Haka on the Burmese side ; 6,000 square miles of topography were completed on the quarter-inch scale, and Lieut. Renny-Tailyour, who had charge of the survey work of the eastern column, covered about 3,000 square miles of previously unknown tracts. In Afghanistan and Baluchistan, triangulation, topography, and surveys, on various scales, were carried on under the supervision of Colonel Holdich. The party was divided into five sections, one of which was attached to Sir R. Sandeman's expedition to the Zhob valley. Work was also accomplished about Quetta, Pishin, the Toba plateau, and the Perso-Baluch frontier. In Persia, a distinguished native officer, Yusuf Sharif Khan, surveyed about 25,000 square miles of country on the scale of eight miles to one inch. Though without the advantage of a triangular basis, the work is, in general, accurate, as is shown by a comparison of the positions of certain well-known places with Colonel St. John's observations. Lastly, Colonel H. Tanner, who has recently retired after twenty-eight years' service, executed a large quantity of miscellaneous work in the Himalayas.—*The Times*, August 31st.

Proposed Russian Railway to Sarakhs.—Mr. George N. Curzon, in a letter to *The Times*, August 8th, states that the Russians intend to construct a branch-line from the Trans-Caspian Railway to the limits of the Russian territory. Three routes have been proposed : one from the station of Dushak to Sarakhs, a distance of 100 miles ; another from Merv up the valley of the Murghab to Penjdeh ; and the third, which will most probably be chosen, from Karri-bent, where the Trans-Caspian Railway crosses the Tejend, along the valley of that river to Sarakhs. This town is conveniently situated for the introduction of Russian goods into Persia and Afghanistan, being 100 miles from Meshed and 170 from Herat.

The Kuen Lun Mountains.—The *Zeitschrift der Gesell. für Erdkunde zu Berlin*, Bd. xxvi. No. 3, contains a long discussion on the orography of the Kuen Lun by Dr. Georg Wegener. It concludes with a description of the range as a whole. This range extends from the meridian of 75° E. long. to that of 118°, and from lat. 30° to 40° N., and has a length of 2390 miles, with a maximum breadth of about 500 miles. The area it covers may be roughly estimated at 425,000 square miles, or about double that of the German Empire. It consists of six parallel chains, running from east-south-east by east to north-north-west by west, of which the southern three are the longer and overlap one another, each extending more to the east than the one to the south of it. The fourth chain is broken by the great depression of Tsaidam, and the fifth has an outlying continuation in the Sung-Shan, near Kai-Fong. Each of these chains consists of a number of secondary

chains ; indeed, the chief characteristic of this mountain-system is its tendency to run in straight and parallel chains. The greatest elevation is attained in the west. The most southern chain has an elevation at its western extremity of over 20,000 feet, and does not sink below 16,000 or 17,000 feet as far as the Tang-La Pass. The average height of the other chains diminishes towards the north, but here also the greatest elevation is in the west. The base on which the Kuen Lun stands sinks more rapidly than the mountains. Consequently, the relative height of the parallel chains increases towards the north, though their absolute height decreases. Both in the western and central parts there is a remarkable scarcity of animal and vegetable life. On the Tibetan highlands of Tsang there is, indeed, an astonishing abundance of mammalia, which probably owe their existence less to more favourable soil than to the absence of human beings. Vast regions in the Western and Central Kuen Lun are uninhabited, namely, those where sand-storms prevail. Some of the lower parts are traversed by nomads. Only at the edge, in isolated irrigation oases, is agriculture practicable. The geological structure, as far as has been ascertained, is of very ancient date, and proves that the Kuen Lun is one of the oldest parts of the continent. The coal period is the latest represented in its rocks. Dr. Wegener devotes a considerable space to the discussion of the geology of the Kuen Lun and the adjoining regions. The map which accompanies the article contains, of course, much that is new. On a sheet of transparent paper, which may be laid over the map, are marked the routes of travellers in Central Asia.

Yezo.—The island of Yezo, or Hokkaido, has an area of about 30,500 square miles. Its population, said to have been 27,000 in 1869, was, in 1889, 254,805 (including the Kurile Islands), according to the Japanese census reports. The Government is actively developing the country. It is constructing a net-work of roads by convict labour, and intends to form a new capital near the source of the river Ishikari. The plan provides for 17,472 colonists, besides 1920 houses for Tonden-he. These latter are military colonists, each of whom receives a grant of about 8 acres of land and a house, on condition of serving in war up to the age of 40. Another town is to be founded on the Sarachi. A railway from Sapporo to Mororan has been proposed, the harbour at this place being more convenient than that of Orunai, where the coal of Yezo is now shipped. The dwellings of the inhabitants are by no means adapted to the rigour of the climate : those of the military colonists are slightly superior, and consist of two apartments. Cultivation and fishing are the chief occupations. Vegetables, millet, potatoes, wheat, barley, rice, and beet-root are cultivated—the last for the making of sugar. Cattle, pigs, and other domestic animals are kept in small numbers, but little attention is bestowed upon them. The Government has set up mills and sugar and hemp factories. At present they have not been remarkably active, owing either to the deficiency of raw material, or to the absence of a demand for the finished article. Fishing is a far more important industry. The annual value of the products of the sea is about £833,000, and it is on them exclusively that the taxes are levied. Herrings, salmon, and trout are extraordinarily plentiful on the northern and western coasts of the island, and cod is caught in the deep water. The native fishermen number about 60,000, and in the season these are reinforced by hired men from the island of Nipon. There are in the whole island about 17,000 Ainos, but their number is decreasing owing to the effects of disease and, more than all, intermarriage with the Japanese. In the north-east they are still in a state of degradation, but along the shores of Volcano Bay they are beginning to occupy themselves in agriculture. They are well treated by the Govern-

ment, and enjoy the same rights as Japanese. Where it is possible, their children attend the Japanese schools.—*Cosmos*, vol. x. No. viii.

The Volcano Islands have been annexed by Japan. The group lies 135 miles to the south-east (south-west ?) of the Bonins and about 1700 miles from Yokohama. It consists of Sulphur Island, situated in 24° 46′ N. lat., and 141° 19′ E. long. ; St. Alexander, 40 miles to the north of Sulphur Island ; and St. August, at the same distance to the south. The area of the middle island, which is the largest of the three, is only 5 square miles. The only natural product of any importance is sulphur, which is found in a very pure state ready for shipment. The natives of the Bonins also visit these islands for the sake of the fishing.—*The Times*, September 2, 1891.

Sumatra.—Letters from Signor Elio Modigliani have been published in the *Boll. della Soc Geog. Italiana*, Fasc. iv. and v. He landed at Siboga in the autumn of 1890 with the intention of exploring the Toba Lake, and, after visiting the Dutch resident at Padang Sidempuan, thirty-seven miles up the country, started for the lake with forty-one men. The second day he came to the foot of Mertimbang, an extinct volcano and the loftiest summit of that part of the country, being 5380 feet high. From this mountain extends to the north-east the immense valley of Silindung, some 50 miles broad and 60 or 70 long. On the north it is confined by the plateau of Toba, and on the other sides is dominated by lofty peaks—among them the Deloc Daung, 5790 feet in height. Whereas Baron von Brenner-Felsach (*Vide S.G.M.* vol. vii. p. 34) approached the Toba Lake from the north, and made acquaintance with its eastern shore, Signor Modigliani arrived at Balige, on the southern shore of the lake, and visited its south-western extremity. Balige and Laguboti belong to the Dutch ; the rest of the country round the lake is independent, and, unfortunately for Signor Modigliani, the Battaks, under their raja, Singa Manga, were at war with the Dutch. They received him, however, very hospitably as soon as they were convinced that he had no connection with the Dutch Government. The elevation in the middle of the lake, called by Brenner-Felsach an island, is, according to Modigliani, a peninsula. The length of the lake he states to be about 160 miles. Having procured the loan of the Government boat, Signor Modigliani made an excursion to the south-eastern corner of the lake, accompanied by a native raja in his canoe. This canoe was hollowed out of a single trunk, was 60 feet long by 3 broad, and was propelled by 18 rowers. The raja sat at the prow, leaning against a carved post. On the way they were met by Hutsa, the raja of Pardapur, who, on his return eastwards, made himself very useful in conciliating the natives. Pardapur appears on maps as the name of an island opposite Ade Ade, but it really is the name of the late raja, the father of Hutsa. Ade Ade is not a large village, but its raja rules many other villages also, and possesses considerable wealth in horses, buffaloes, and cows. One of his sons gave Signor Modigliani a Battak calendar engraved on a piece of bamboo, which indicated lucky and unlucky days. The Gulf of Bacara, at the south-western extremity of the lake, is deep and picturesque. Here is situate the residence of Singa Manga Raja, a very rich and powerful chief and head of the Battak priests. The village, surrounded by a stone wall and a fence of bamboo, had lately been destroyed by the Dutch. From a mountain near a fine view was obtained of the peninsula of Samosir and the adjoining volcano, Pusuc Buhit. In a direction west to east (magnetic) from this mountain (Jangi Raja, 2560 feet above the lake) soundings were taken of 142, 246, etc., on the west, diminishing to the east down to 22, fathoms. The temperature at the bottom was not more than 2° F. lower than at the surface. The temperature of the air is very high, especially in

the afternoon, owing to the reflection from the water: at times it exceeds 104° F. Fish are abundant, but the species are few. Signor Modigliani saw only four kinds of fish, two of molluscs, and two of crabs. Insects are innumerable, and bats of many different species are found, but mammals are scarce, owing to the absence of wood. In order to obtain specimens of the latter, the explorer had a hut erected in the forest of Si Rambé, to the south-east of Laguboti, at an elevation of 4500 feet above sea-level. When he wished to continue his travels in the neighbourhood of the lake, he was prevented by the Dutch authorities, who forbade him to enter any village unless the chief guaranteed his security. However, Signor Modigliani made an arrangement privately with independent Battak chiefs, and, contriving to elude the watchfulness of the Dutch, set off towards Bandar Pulo. On the way he visited the great cascade over which the water discharged from the lake falls on its way to the river Assahan. The water issues from a huge cleft in the mountain, and forms an imposing fall over 300 feet in height. It descends into a basin 300 yards long and 100 broad, with precipitous sides. The spot is shunned by the Battaks, who suppose that spirits dwell there. The Battaks of the country detest the Dutch, and no wonder, if it be true, as Signor Modigliani was informed, that when a military expedition marches to punish any refractory village, the friendly rajas who accompany it are allowed in recompence to sack the villages along the route. Signor Modigliani did not stay long at Bandar Pulo, being afraid lest the *Controleur* of Tanjung Batei should expel him from the island, but, turning southwards to the river Kwalu and the village of Hite Tano, regained his quarters in the forest of Si Rambé. He had made large collections of small animals, Battak utensils, photographs, etc. When Signor Modigliani wrote his last letter (February 10th), a cannonboat was waiting at Siboga to carry him to Engano, which island the Geographical Society of Batavia wished him to explore, but his plans were not fixed.

The Island of Rhodes.—The *Bull. Consulaire Français*, June 1891, contains a report on the production, commerce, etc., of this island. It is situated at about 12 miles from the coast of Karia, and is of an oblong form, being approximately 43 miles long and 20 miles broad (from Cape Lartos to Cape Monolithos). Its area is about 436 square miles. A chain of mountains traverses the island in the direction of its greatest length, culminating in the mountain Attaïros, 4070 feet high. The country is in general mountainous, and the calcareous earth washed down from the summits forms a rich soil which covers a considerable area of the lowlands. The island contains no lakes or rivers, but water is abundant, owing, it is supposed, to a subterranean stream, which has its sources in the snow-clad summits of the Taurus and Lebanon. The forests have been destroyed recklessly, but conifers still cover a quarter of the surface, and on the mountains which are not clothed with forest grow pistachios, rhododendrons, myrtles, and a large variety of medicinal plants. The climate is particularly mild and healthy, even for the Mediterranean. The mean temperature in summer ranges from 68° to 86°, and in winter seldom falls as low as 40°. There is a marked difference in the climates on the two sides of the central range; on the south side the crops ripen a fortnight earlier. The population is on the decrease, a stream of emigration being kept up by the heavy agricultural taxes. According to the most recent statistics the number of inhabitants is 30,000, of whom 16,000 are Greeks, 10,000 Turks, and the remainder Jews and Europeans. The town of Rhodes contains 14,000 inhabitants: the other 16,000 are distributed among 54 towns, villages, and hamlets, the most important of which are Lindos, Ambonas, and Kastellos.

The system of agriculture is of the most primitive kind. Rotation of crops is

unknown, and the ancient method of dividing the arable land into three parts, each of which lies fallow for two years, is still in vogue. The implements employed are of a very simple kind. The peasant suffers much at the hands of usurers, and finds a difficulty in disposing of his produce in the absence of open markets and cart-roads. Besides cereals, fruits, and other food-stuffs, silk and cotton are produced, and viticulture is gaining ground. The mules are of a good breed, and horses, asses, cattle, and pigs are kept, but butcher's meat is supplied chiefly by Asia Minor. The oil of the island is excellent, but does not stand high in the market owing to its dark greenish colour. The annual values of the principal products of the island are, on the average, as follows : wheat, £72,000 ; olive oil, £16,280 ; fruits and vegetables, £12,000 ; barley, £7500 ; and wine, £6600. Sponges are an important article of export, the value in 1890 having been £137,440. Manufacturing industry is but little developed : tanning, weaving, and the fabrication of crockery are carried on to a small extent. Mines, still unexplored, of chrome, manganese, iron and coal exist, and coloured marbles are found in the mountains.

The total commerce in 1890 amounted in value to £459,888, of which £243,560 represents imports and £216,328 exports. The largest share in the foreign trade is taken by Austria. The low price of her goods, regularity of transport, and low freightage give her an advantage.

AFRICA.

Survey of Tunis.—The only map of Tunis which has existed hitherto is one executed by General Perrier soon after the French occupation. It is on the scale of 1:200,000 and, owing to the state of the country at the time, is very defective. Now the Geographical Department of the French army is engaged in the production of a new map, of which the first section, La Goulette, on the scale 1 : 50,000, has already appeared. It represents an area of about 20 miles by 12 miles, including the town of La Goulette, or Goleta, the southern part of the Gulf of Tunis, the southern part of the Bahira Lake, Jebel Kurnin, the Soliman Plain, etc. The execution is neat, and six different colours are employed for buildings, cultivated lands, roads, etc. The heights of the chief elevations are given in mètres, and the depths of the sea are indicated by contour-lines at every ten mètres interval. When finished, the atlas will probably consist of 320 sheets.—*Petermann's Mitteil.* Bd. xxxvii. No. 8.

The British South Africa Company.—The dangers which threatened the well-being of the Company have now vanished. Friendly relations have been established with the Matabele, harmony is restored with the Portuguese, and the Boer *trek* is abandoned. The Company is, therefore, able to reduce its large and costly police force of 650 men, and 200 will be immediately discharged, with compensation in the form of prospecting rights. The Company's work, up to the present, has been chiefly confined to the establishment of means of communication. A railway, 124 miles in length, from Kimberley to Vryburg, was sold to the Cape Government. The second section, which is also to be constructed by the Company, will run from Vryburg to Mafeking, a distance of 98 miles. It is proposed to continue the line through Molopole and Tati to Bulawayo, distant 450 miles from Mafeking. Good progress has been made with the main roads. The Pioneer Road leaves the line of the proposed railway near Shoshong, and proceeds in a north-easterly direction, past Forts Tuli, Victoria, and Charter, to Fort Salisbury. Another road is in course of construction across the Portuguese territory to the coast. The telegraph

has been extended from Fort Tuli to about 60 miles north of Fort Victoria, and the Company has expended £60,000 in establishing telegraphic communication with Mashonaland.— *The Times*, September 2.

As regards the Beira Railway, the *Colonies and India*, September 26th, states that it will undoubtedly be carried along the Busi River, this route being much preferable to the Pungwé valley. The harbour of Beira is six miles long by two wide, and affords splendid anchorage for vessels.

AMERICA.

The Sources of the Mississippi.—Mr J. V. Brower, who, in 1889, was selected by the Minnesota Historical Society to conduct an expedition for the purpose of discovering the true source of this river, and has since been appointed commissioner of the Itasca State Park, has forwarded to us a copy of a report, dated August 13th, 1891. There seems to have been no doubt that the stream flowing out of the Itasca Lake was the main feeder of the Mississippi. Mr Brower's task consisted in finding the most important of the creeks flowing into the lake. Itasca Lake consists of three arms; the Mississippi emerges from the northern arm, while the western and eastern receive water from numerous smaller lakes connected by small creeks. Mr. Brower found that the Nicollet valley, which descends to the western arm, was the greater of the ultimate reservoirs. The head of Howard Creek, a feeder of Nicollet's Infant Mississippi, is the furthest point from the mouth of the Mississippi, the distance along the waterway being 2552·2 miles. On the other hand, Elk Lake, which pours its waters through the Elk Creek into the Itasca, is situated in a more remote part of the valley. This lake was discovered by Julius Chambers in 1872. Above Elk Lake lie Morrison, Hernando de Soto, and several other smaller lakes close to the watershed. Brower Island, in Hernando de Soto Lake, lies in 47° 8′ 50″ N. lat. and 95° 12′ 48″ W. long. The altitude of Lake Itasca is 1470 feet, and the Morrison and Hernando de Soto Lakes are 101 feet higher. The first white man who visited the country was William Morrison, in 1803, and Nicollet explored the western valley in 1836.

"**Why are the Prairies Treeless?**" was the subject of a paper at the recent meeting of the British Association, by Mr. Miller Christy, of which the following abstract has been supplied by the author :—

"The fact that the prairies of the Mississippi Valley (excluding the more western 'plains') are mainly treeless, in spite of an unusually fertile soil, a favourable geographical position, and a suitable climate, has attracted much attention in America, where many theories have been advanced to account for it. Professor Leo Lesquereux has argued that the soil of the prairies, being lacustrine sediment, is incapable, by reason of its acidity, to support trees. Professor J. D. Whitney has urged that the extremely fine texture of the soil is unsuited to the growth of trees; while Professor Winchell has argued that the germs of all arborescent vegetation were destroyed at the time of the last great glacial epoch. Other theories adduce the cold of winter, or the heat of summer, or insufficient rainfall, as the reason for the absence of trees; but none of these theories seems to me adequate. I believe the main cause is the prevalence of the vast *prairie-fires*, which for generations past have swept over the prairies almost annually, killing the trees and preventing the growth of others. The Indians originally started these fires in order to reduce the labour of hunting the buffalo, by limiting the feeding-grounds; but now the fires are usually started by settlers or travellers. They take place in the autumn, as soon as the frosts have killed the grass, or in the spring, after the

snow has gone. In spite of most stringent laws against firing the prairies, the greater part of their area gets burned over annually; for on the level prairie, when the grass is dead and dry, and a high wind is blowing, a single prairie-fire may (and often does) run for hundreds of miles. Professor Hind mentions one which in 1857 extended one thousand miles in length and several hundred in width. Every settler on the prairies has to put a 'fire-guard' round his premises, by turning a few sods with a plough, as a protection against the fires. In dry districts, where the grass is short, this simple precaution is sufficient; but, in most regions, where the grass grows long, a wide river will not stay a fire, and many travellers have given stirring narratives of their adventures on such occasions. The only escape in such cases is to start another fire in advance, and to take refuge on the ground thus burned. The spectacle presented by such extensive fires, especially at night, is appallingly grand. To the annual burnings of the grass I attribute the excessively fine, black, soot-like texture of the prairie soil and its extraordinary fertility. I exhibit a specimen of soil I obtained on the prairie in Manitoba several years ago. In that district, at least, the fires are accepted as the cause of the remarkable nature of the soil. Of course, the prevalence of fires for generations past must have considerably altered the fauna and flora of the prairie region. I have devoted considerable attention to the Molluscan fauna of Manitoba (*Journal of Conchology*, 1885, p. 339) and find that, though fresh-water species abound in every pond, not a single species inhabits the open prairie. I attribute this to the great prevalence of fires. Again (as I have already pointed out in *Nature*, 1884, p. 213), worms are quite absent from the prairies, in spite of Mr. Darwin's statement as to their wide distribution and value as fertilising agents. I consider the fires to be the cause of their absence. Further, very few except burrowing mammals habitually frequent the prairies. The buffalo is almost the only notable exception. That there is nothing in the physical or chemical constitution of the prairie soil inimical to the growth of trees is as certain as that fishes can live in water; for trees grow readily when properly planted, and nearly all the prairie States have passed tree-culture Acts, which have been perfectly successful. Indeed, it is not too much to say that, in time, when trees enough have been planted, or the fires cease with extended cultivation, the prairies will disappear. Further, wherever on the prairies a piece of ground is protected from fire for a single year, young willows and aspens spring up, even when far removed from any other trees, the old roots having either retained their vitality, or the downy seeds having been brought by the wind—indeed, in May, the air of the prairies may sometimes be seen full of poplar-down. These facts, I think, refute, more or less, all the views I have already quoted as to the treelessness of the prairies, nearly all of which assume that trees cannot grow on the prairies because of some peculiarity in the soil or climate. Evidence as to the past destruction of forests on what are now prairie areas is very conclusive. I have many times with my own eyes seen the destruction in progress, and I can lay my finger on scores of passages in which residents on, or travellers over, the prairies, government surveyors and others, have recorded their observations of the same thing. In most parts of the prairies every grove which is not in some way protected is largely diminished in area yearly by the fires. The legends of the Indians, too, tell of extensive forests where now all is prairie. The works of Professors Hind and Macoun, both of whom have scientifically explored the North-West on behalf of the Canadian Government, contain many passages in support of these statements. In one place, the latter says that where the former passed in 1857 and saw 'large forests,' he passed in 1880 and 'never saw a twig.' Dr. Asa Gray, in a paper he read before this Association in 1884, said that the prairie country was 'in the main naturally wooded,' but had been 'either

greatly extended or even made treeless under Indian occupation and annual burnings.' Novel as this view may be on this side of the Atlantic, it is supported by many competent American and Canadian observers, and is, I am convinced, sound. Wherever water protects a piece of ground on the prairies from the ravages of fire, there trees grow. Sandhills have much the same effect: their poverty prevents their growing sufficient grass to carry fire, and thus such trees as grow upon them are safe. Thus we have the paradox that, whereas vast areas of abnormally fertile soil are quite treeless, smaller areas of extreme sterility are timbered. I repeat that I believe the treelessness of the true prairies (among which I do not include the high and arid plains further west) is, in the main, due to the long continuance of annual prairie-fires. Other subsidiary causes there may be: thus, the level character of the prairies and the exceptionally high winds that sweep over them are doubtless factors, without which the fires could not run for long distances; while the peculiar dryness of the prairie grass after the first frosts of autumn has also to be taken into account. The fact that, in other continents, where fires have not prevailed, large areas of fertile soil are also treeless, cannot, I think, be taken as any disproof of my contention. But, as I have no personal knowledge of these other areas, I leave others to acccount for their treelessness."

Census of Jamaica.—On the 5th of April last the total population numbered 639,491, of whom 305,948 were males, and 333,543 females. The increase during the past ten years has been 58,687. The female population has increased by 12 per cent., and the male by 8 per cent. only.—*The Times*, August 8.

The Climatology of Brazil.—A pamphlet by Sr. H. Morize, entitled *Esboço de uma Climatologia do Brazil*, has been issued from the Observatory of Rio Janeiro. The author divides the country into three great zones—tropical, subtropical, and temperate. The first, in which the mean temperature exceeds 77° F., embraces the northern part of Brazil, and is bounded to the south by a line running along the south side of the state of Pernambuco, across Goyaz, and somewhat to the south of Cuyabá. The second lies between the isothermals of 77° and 68°, and extends into S. Paulo and Paraná, leaving a portion of these provinces, with Sta. Catharina and Rio Grande do Sul, to form the third zone, in which the mean temperature oscillates between 68° and 59°. The tropical zone may be again divided into three regions, the Upper Amazons, Matto Grosso and the interior of the states on the Atlantic border, and the Littoral. On the Upper Amazons there are two rainy seasons, the principal one lasting from the end of February to June, and the other from the middle of October to the beginning of January. During the intervening dry season the rivers fall sometimes as much as 46 feet. Sr. J. Pinkas found that the mean temperature was 79°, but the maximum was 103°, which is comparatively low. The heat, however, was very oppressive, owing to the excessive moisture in the air. The prevailing wind blows from the south-west, and is frequently interrupted by calms. Towards the end of the great rains the phenomenon known as *friagem* occurs, which is a sudden fall of temperature produced by an influx of cold air from the Andes. It can only take place on a calm day, and is preceded by a high temperature, an almost complete saturation of the air, and a barometric fall of about ·2 inches. In the second subdivision heavy rains occur in spring and summer, and the thermometer often rises as much as 35° in a few hours. These sudden changes are produced by the rapid alternations of north-west and south-east winds, the former warm and moist, the latter always very cold. Dr. Morsback gives the mean temperature as 79°·25 F. The average rainfall is 45·9 inches, and the number of raining days 85. In this region also there is a period of *friagem*. The third subdivision is characterised by rains in summer

and autumn, and particularly during the month of April. The differences of temperature are much less than in the other subdivisions, 84° F. having been recorded at Vizeu in Pará during December, the warmest month, and 80° F. at the same hour, 9 A.M., during July, the coolest month. The mean rainfall is about 58 inches. In the dry season the prairies are withered and scorched by the heat, and the cattle that feed on them suffer terribly. Occasionally the rains do not make their appearance at all, and then famine spreads throughout the country. This calamity has occurred six times already during the present century.

The subtropical zone closely resembles the warm regions of the south of Europe. Both the temperature and the rainfall vary considerably according to the situation. The climate of the third zone is one of the finest in the world, and therefore the states comprised in it have been almost exclusively chosen by European immigrants. The rainy season does not occur in the same months as in the other regions : rain falls chiefly in the winter and autumn. As the distance from the Equator increases, the transition between the wet and dry seasons becomes less distinct. As the meteorology of São Paulo and Rio Grande do Sul has already been noticed in this *Magazine* (vol. vi. p. 322, and vol. vii. 556), it is not necessary to give further details. Sr. Morize's paper is very useful for those who wish to study the subject minutely, for he has collected numerous records of observations from all parts of the country.

Misiones.—The boundaries and extent of this Territory are not, it would seem, correctly given in atlases, geographical dictionaries, etc. Its area is usually given at about 23,900 square miles, and this is the estimate of Sr. Niederlein (*Bol. del Instituto Geogr. Argentino*, tomo xi. cuad. x.-xi.), who worked in the country as botanist during the years 1883 to 1888, and is considered the best authority on questions relating to this part of the Argentine territory. But in this area is included the territory which has so long been a subject of dispute with Brazil, and which occupies one half of the above area, extending as far as 50° 8′ 1″ W. long. The eastern boundaries are the rivers San Antonio-guazú or Jangada, and the Piquiri-guazú or Chapecó. The former must not be confounded with the San Antonio, which partly forms the boundary of the undisputed territory, nor is it the Chopim, which may, indeed, be one of its tributaries. The boundary on the Corrientes side runs from the mouth of the Chirimay in the Uruguay to that of the Garapé in the Paranà, not far from Ituzaingó. Sr. Niederlein gives the longitude of the most western point as 55° 50′. If this is correct, Ituzaingó is usually placed too far west. The population of the undisputed territory in 1888 was 10,736, of whom 5968 were males, and 4768 females. 11,040 acres have been brought under cultivation, and produce maize, sugar, manioc, and other crops. Oranges, grapes, bananas, and other fruits are also grown. But the chief wealth of the country consists of cattle and horses. There are about 5 head of cattle per inhabitant, and about 2·8 horses, mules, etc., besides sheep, goats, and pigs. The disputed territory, which has now been divided between the claimants (*vide S.G.M.*, vol. vi. p. 380), is much more sparsely populated, with only 2300 souls. The great bulk of the settlers are located in the district of Boa Vista, the town of Palmas (known also as Cachoeira), and the Chopim military colony. They have cleared about 2200 acres for cultivation, and own about 38,000 head of cattle and 5100 horses, besides mules, sheep, pigs, etc. Mr. Coffin of Rosario has lately ascended the Paranà to visit the Guaira and Y-guazú Falls, and *The Standard* of Buenos Ayres, July 24, gives an account of his journey. He arrived at Tacurú Pucú, the limit of navigation, in the dry season, on June 14, and, in consequence of a very heavy fall of rain, most unusual in winter,

was able to continue his journey on the 23d. After passing through the Tucuama rapids he was stopped by the dreaded Correderas del Yoguy, a succession of boiling whirlpools and sunken rocks, and was unable to reach the Guaira Falls in lat. 24° 3′ 31″ S. From the description given by the pilot, they are a series of rapids and cataracts, and are not to be compared with the superb fall of the Y-guazú. Petersen, a Dane, who explored the Alto Paranà in 1883, counted seven distinct falls connected by rapids. The Victoria Falls, about twelve miles from the mouth of the Y-guazú, are more than 200 feet high, and the volume of water that comes over them must be very considerable.

GENERAL.

The Upper Strata of the Atmosphere.—There is a very interesting article by Professor Förster in the *Verhandl. der Gesell. für Erdkunde zu Berlin*, Bd. xviii. No. 6, in which the questions concerning the limits of the atmosphere and the circulation of its upper strata are clearly enunciated, and the observations most likely to contribute to their solution indicated. Calculations, based on observations of the refraction of light, led to the belief that, at a height of about 50 miles, the air became so rare that this distance might be taken as the depth of the atmospheric envelope. During the present century, however, observations have been made of the distances of meteors from the earth when, owing to the heat engendered by their rapid flight through the atmosphere, they begin to emit light, and the results seem to indicate that the atmosphere extends upwards to about 110 miles. But then the question arises, whether the incandescence of these meteors is caused by the resistance of an atmosphere properly speaking terrestrial—that is, a mixture of oxygen and nitrogen moving with the earth—or takes place in an interstellar atmosphere. The fact that the Aurora Borealis extends to a height of 300 to 350 miles tells in favour of the latter hypothesis. We are all aware that the orbits of heavenly bodies, such as Encke's Comet, Jupiter's satellites, etc., are subject to changes only to be accounted for by the action of some resisting medium, and it would be very satisfactory if it could be proved, by spectrum analysis, for instance, that the Aurora occurs in a medium of different composition from our atmosphere—gases ejected by the sun or produced by the explosion of meteoric bodies. Suppose, in the next place, that this atmosphere—not merely a medium for the propagation of light, which we call ether, but a gaseous substance capable of considerable resistance—does exist, and moves with the solar system and independently of the relative movements of the earth ; it will, then, naturally exercise a pressure on the outer strata of the terrestrial atmosphere. The height of the barometer will be increased by this pressure during the morning hours, the station of the instrument being then on the front side of the earth. There certainly is a morning maximum, but at present it is impossible to eliminate the effect of pressure from an external atmosphere from those due to temperature, attractions, etc. Luminous clouds are phenomena of the greatest importance in the investigation of the circulation of these upper strata. To these Herr O. Jesse has paid particular attention (*see* p. 98). They were first noticed in August 1883, after the eruption of Krakatoa, and are no doubt formed by particles projected to a great height, where they receive the light of the sun all through the night when near the Pole. The clouds appear to wander periodically from one Pole to the other, being always found in either hemisphere during the summer, as though they sought the region of least pressure. Professor Förster's paper gives a glimpse of a very interesting field of observation, in which great assistance may be given by those even who are not provided with scientific instruments.

Photogrammetry.—Photographs can now, since the invention of dry plates, be taken in the field with very little trouble, and plans may be constructed from them at any convenient time. And not only does this method of plan-drawing considerably reduce the labours of surveying on the ground, but it renders possible the planning out of tracts where instruments can be carried only with great labour, or which are inaccessible, such as glaciers and precipitous slopes. The engineer, Friedrich Steiner, has published a work on *Die Photographie im Dienste des Ingenieurs*, in which he explains the processes by which plans may be constructed from photographs. Whereas by the science of perspective from a ground-plan and elevation of a building or other object a pictorial representation is constructed, in photogrammetry the plan is evolved from the photograph by a knowledge of the same principles. A building, since it contains vertical and horizontal lines at right angles to one another, presents fewer difficulties than hills, where the outlines are curved, and therefore it will be well to begin with a description of the process by which Herr Steiner develops the ground-plan from a photograph of the German Theatre in Prague. The lines of the roof and base of the building, when produced, meet in two points on either side of the picture, which are, of course, the vanishing points of those lines, and determine the Horizontal Line of the picture-plane. Then, by drawing lines from diagonally opposite points of the roof, each to the opposite vanishing point, the perspective ground-plan of the building may be constructed, and the diagonals of this plan produced to their vanishing points in the Horizontal Line. The length and breadth of the building are ascertained by actual measurement, and a rectangle is drawn on the paper on any desired scale, so placed that one of the diagonals lies in the direction of the corresponding vanishing point. Now, the Station Point must lie on the semicircle described on the line between the vanishing points of the horizontal lines of the building, and its position may be found by describing a circle through the vanishing points of the diagonals of the ground-plan and the centre of the rectangle described as above. From this point, the intersection of these two circles, lines are drawn to the orthogonal projections of the angular points of the ground-plan on the Horizontal Line, and the rectangle, transferred to tracing-paper, is moved about until its angular points lie each on its corresponding radiating line from the Station Point. The small details of the plan may then be filled in without difficulty. In the case of a landscape the Station Point and Principal Visual Ray cannot be thus easily found by the aid of vanishing points, but they can be obtained by a mathematical construction, if the relative positions of five points be ascertained by the ordinary methods of surveying. The problem depends on a property of conics, and is rather too abstruse for insertion here. Nor is a knowledge of it necessary, for these elements and others may be obtained by means of instruments, and, with a view to facilitating the methods of photogrammetry, special instruments have been devised, called photogrammeters and phototheodolites. These are described by Herr Vincenz Pollack in the *Mittheil. der k.k. Geog. Gesell. in Wien*, Bd. xxxiv. No. 4. Wires placed in front of the sensitive plate mark the Horizontal Line and Principal Visual Ray on the photograph, and with the latter instruments angles may also be observed, so that two or more photographs taken at different stations may be placed in their proper relative positions, and the chief points of the plan fixed by the intersection of lines drawn on the paper from the picture planes to their respective Station Points. It will be easily understood that it is an advantage to place the sensitive plate in a vertical position. Sometimes, however, this is impossible, and Herr Schreiner shows how to treat such cases. Herr Pollack gives an interesting account of the progress of photogrammetry and the work that has been done in Germany and Italy.

MISCELLANEOUS.

A company has been formed to construct in German East Africa **A Railway from Tanga to Karagwe**. It will also have power to construct other railways, forts, etc., to acquire territory, and to exploit it. The capital has been fixed provisionally at two million marks.—*Revue Française et Exploration*, October 1.

M. Emile Chaix has forwarded the program and report on the progress of the **Bibliographie der Schweizerischen Landeskunde**, which is being compiled in answer to the invitation addressed to the countries of Europe by the Geographical Congress. These are accompanied by the proof-sheets containing the literature of the surveys and a list of maps embracing the whole of Switzerland.

At the sixty-fourth meeting of German naturalists and physicians at Halle, on the 22d of September, Dr. Below gave an important address on **Health in the Tropics**. He came to the conclusion that the opening up of the Tropics for Europeans was practically a question of hygiene, and that, with proper sanitary precautions, the most apparently unhealthy districts may be rendered salubrious.

The King of the Belgians has offered a **Prize of 25,000 francs** (£1000) to be awarded in 1897 for the work giving the most satisfactory replies to the following questions :—

Describe, from the sanitary point of view, the meteorological, hydrological, and geological conditions of the territories of **Equatorial Africa**. Deduce from the present state of our knowledge concerning these matters the hygienic principles suitable for these regions, and lay down, with observations in support of the conclusions arrived at, the best scheme of life, diet, and work, as well as the system of clothing and form of dwelling best adapted for the preservation of health and vigour. Describe the symptomatology, etiology, and pathology of the diseases which characterise the regions of Equatorial Africa, and indicate the treatment, both prophylactic and therapeutic. Define the principles to be followed in the choice and use of medicaments and in the establishment of hospitals and sanatoria. In their scientific researches, as well as in their practical conclusions, competitors should particularly take into account the conditions of existence of Europeans in the different parts of the Congo basin. The prize is open to foreigners as well as to Belgian subjects. Competitors must send in their works to the Minister of the Interior and of Public Instruction at Brussels before January 1, 1897.—*British Medical Journal*, September 26, 1891.

NEW BOOKS.

The Rural Economy and Agriculture of Australia and New Zealand, as seen by Robert Wallace, F.L.S., F.R.S. Edin., Professor of Agriculture and Rural Economy in the University of Edinburgh, Author of *India in 1887* ; *Farm Live Stock of Great Britain* ; etc. With 10 Maps, 90 Full-page Plates, and 24 Illustrations in the Text. London : Sampson Low, Marston and Co., 1891. Pp. xvi + 541. *Price* 21*s*.

Professor Wallace's book is the outcome of a tour through the Australian Colonies and New Zealand in the summer of 1889—a tour made under the happiest auspices. Every facility and opportunity seem to have been afforded him by the high officials, agriculturists, and leading men of all the colonies. The result is a work full of valuable and reliable information about the agriculture of that part of

the World, and about almost everything that immediately concerns the farmer and the intending settler, and even the man of public business.

The book contains two divisions : in the first (observing a just proportion—six chapters out of thirty-nine) the author describes his journey, and relates those incidents of the tour which are of a personal character ; in the remaining thirty-three chapters he treats of various prominent topics connected with Australasian agriculture. The arrangement in this particular case is the best that could have been made. The principal fault is a tendency on the Professor's part to devote too much attention to the influential men who furnished him with information, or who gave him an opportunity to inspect their estates. This element, whilst it will perhaps secure for his book a warmer welcome in the Colonies, will certainly tend to detract from its permanent value. The observations on General Reid's will, whilst perhaps just in substance, are unquestionably out of place in a work of this kind ; and so are such passages as those on pp. 14-16, 35-36, and 59. In the second division Professor Wallace is in all respects admirable ; he is a shrewd and competent observer, knows just what to observe and what relative value to attach to what is brought under his observation ; he presents his information in a most able and interesting way ; is possessed of an extensive store of varied knowledge, and gives a wonderfully full account of the agricultural world of the Australasian Colonies. There are extremely interesting chapters on irrigation, on vine-growing, on the chemical analysis of soils, the different kinds and breeds of live stock, agricultural education, implements and machines, the frozen-meat trade with Europe, rabbits, sheep-shearing, the dishorning of cattle, and many other subjects. On all these topics Professor Wallace writes, as we have remarked, with adequate knowledge and sound judgment. To discuss them properly would require far more space than we are able to afford ; and it would be more satisfactory, besides, for the reader to go to the book itself.

The usefulness of the book is greatly enhanced by the numerous well-executed full-page illustrations, nearly one hundred in number, and by a handsome get-up, a good index, complete analytic table of contents, and a device—which the Professor admits to be an innovation and defends on the ground of utility—by which the catchwords in each paragraph are printed in heavier black type. His plea of utility and his defence of the device may stand approved ; nevertheless we think the thing has been overdone. With such a good index and such complete analytic tables of contents as this book has, it was not surely necessary to emphasise half-a-dozen catchwords on each page ; one, or at most two, would have sufficed amply.

The History of Commerce in Europe. By H. de B. Gibbins, M.A., Author of *The Industrial History of England*, and Oxford University Prizeman in Political Economy. With Maps. London : Macmillan and Co., 1891. Pp. viii + 233. *Price* 3*s.* 6*d.*

This present work shows a great advance on Mr. Gibbins' previous book, which we reviewed some months ago (see p. 45 above). The improvement is most marked in composition, in lucidity of arrangement, and in good taste. The idea and purpose of the book are both commendable—to give a succinct survey of the history of the commerce of the chief European nations. This indeed would be a more correct and appropriate title than the one chosen ; for Mr. Gibbins carries his readers often a long way beyond the limits implied in the words "in Europe." The information is grouped under three headings—"Ancient and Classical Commerce," "Mediæval Commerce," and "Modern Commerce ;" and besides this there is a valuable equipment of notes, maps, tables, appendices. In fact, there is rather too much information, too many hard facts, crowded into the little book.

Herein we discern what is one of its chief faults, namely a tendency to heap up dates, bare facts, and minute details in over-profusion. The narrative would read all the better if a number of the summaries of merely *political* events were also cut out. A certain amount of political "orientation" is of course indispensable, but the measure of utility has, we cannot help thinking, been frequently exceeded in this book. It also bears too many marks of haste, and even carelessness, in the writing, which, of course, must impair its usefulness as a text-book, and so far make it untrustworthy. In justice to Mr. Gibbins we ought, however, to say that a number of the things we take exception to are grounded on an unfortunate infelicity of diction. We have space to point out only a few samples of the more glaring kind of blunders :—On p. 11 we read "At the end of the 5th century B.C. (397 B.C.)"; on p. 53 "the Bank of Venice was probably the first established (1871)"; but on p. 167 the date is given as "either 1157 or 1171." Sargon, king of Assyria, is called a *Tartar* (p. 9)! The identity of Ophir is, to say the least, still undecided, though the best authorities put it in Arabia or Africa. The sentence "The Lombards, coming from Jutland" (p. 31) is doubly unhappy. The people alluded to are first known to us as Longobardi; "Lombards" is a much later name. When we first read of them in history, they are already settled on the Elbe, a long way south of Jutland. Pisa, an ancient Etruscan city, could hardly have been founded by Sardinian fugitives (p. 45) fleeing before the Saracens. Nijni-Novgorod fair does not begin on the 1st, but on the 15th July; and its trade is valued, not at 7 or 8 million pounds, but at close upon 19 million pounds (*e.g.* in 1889). Then, again, there are several celebrated fairs not mentioned in the list given on p. 82, as Irbit, Hurdwar, Glasgow, Donnybrook, etc. Middleburg (148) should be Middelburg; Trankebar (162) would look better spelled Tranquebar, and Kerson (164) as Kherson. Lepanto (166) was by no means a victory won by Venice alone; she had powerful assistance from other states. Debrezin (82) is usually written Debreczin. Schonen (64), the southern province of mediæval Sweden, would be more familiar as Scania. The Portuguese king and government emigrated to Brazil in 1810 according to p. 127, but in 1808 according to p. 180; authentic history gives yet a third date. The spelling "Phenicians" can have no authority except some French source. The account of Phœnician enterprise in navigating the seas must be read with great caution; it contains more than one rash or unprovable statement. The Russian serfs were emancipated in 1861, not in 1857 (p. 203). The reasons given on p. 154 for the outbreak of the Peasants' War in Germany are very inadequate, and even misleading, and not in accord with the best German authorities. Amongst the more obvious omissions—nothing is said of the great Anatolian road, or the trade-routes down the Vistula and the Dnieper, across the Balkan Peninsula, through the Khyber Pass, over the passes of the Himalayas, and down the rivers of Burma. The important commercial position and activity of Ragusa are not mentioned; and in later times the very valuable trade with China and Japan is not discussed. The account of the ancient trade of the Orient might well have been supplemented by a brief allusion to the traffic carried on by the Sabæans, then by the people of Petra, and later still by those of Palmyra. The index, too, requires careful revision.

An Asiens Küsten und Fürstenhöfen. Von Leopold von Jedina. Wien: Eduard Hölzel, 1891. Pp. 732.

This is a narrative of exceptional interest. It records the cruise of the *Fasana*, a corvette of 2000 tons displacement, belonging to the Austrian Navy, round the southern coasts of Asia and the outlying islands. Most of the well-known places

of interest were visited, and in addition several that are not usually described in such works of travel. The author, one of the lieutenants on board, knows well what subjects to select and how to describe them. From the fact that the Archduke Leopold was serving as a cadet on the *Fasana*, the cruise partook occasionally of the character of a royal progress. Whilst we have nothing but praise to bestow on the author for his admirable and interesting letterpress, we may be permitted to call attention to the illustrations as forming not the least attraction of the book; they are without doubt almost unrivalled as a series of views on the coasts of Southern Asia, being beautifully reproduced from photographs. A clear and good route-chart accompanies the volume. We can most cordially recommend this work as reflecting the highest credit on author and publishers alike.

Rulers of India: Clyde and Strathnairn. By Major-General Sir Owen Tudor Burne, K.C.S.I. Oxford: Clarendon Press, 1891. Pp. 194. *Price* 2*s.* 6*d.*

In a clear narrative style Sir Owen Tudor Burne groups round the lives of the two chief military authorities in the war of the Indian Mutiny the principal incidents of a critical period in the history of British power in India. Difficult to perform as such a task is in so small compass, the author has not, on that account, unduly narrowed his range of vision, but has given us a view of the causes leading up to the outbreak and the most salient features in the reconstruction—especially military—which followed its suppression. Simple yet not bald in style, moderate in tone, generally accurate in fact and in the interpretation of fact, this book may be recommended as a reliable and readable record of a momentous undertaking.

Sir Colin Campbell was sixty-five years old when, on July 12, 1857, he left London at twenty-four hours' notice (by his own choice) to assume the chief command in India. In his youth he had seen service in the Peninsular and American (1814) wars, and, in his manhood, in the China war of 1842, the Sikh war of 1848-9, and, with great distinction and success, in the Crimean war, when he commanded the Highland Brigade. The new Commander-in-Chief entered on his post in India on August 17th. He stayed, however, over two months in Calcutta (a delay which has been severely criticised), and thus by the fall of Delhi (20th September 1857) the first real step towards the suppression of the Mutiny was taken—as Sir O. T. Burne is perhaps too careful to point out—"unaided by the presence or assistance of the Commander-in-Chief." Those subsequent operations in which he did take part are well described,—the second relief of Lucknow (November 1857), its complete occupation in March 1858, the re-occupation of Bareilly, and, in November 1858, the operations in Oudh. Whether the Commander-in-Chief's plans were the best need hardly be considered here: the author attributes to him too much dependence on large forces, where guerilla warfare was so much engaged in by the enemy, and a lack of vigour and dread of risk. Yet be it remembered that the Commander-in-Chief had peculiar responsibilities, and that the defeat of an English force would have been detrimental to English prestige. Sir Colin Campbell was raised to the peerage for his services, and died as Field-Marshal Lord Clyde on August 14, 1863.

Lack of vigour was no weakness of Sir Hugh Rose, director, with pronounced success, of the operations in Central India. By rapid marches, strategy marked by simplicity and adaptability, and an indomitable energy, Sir Hugh Rose and the Central India Force, of which he was himself the head and soul, traversed over 1000 miles, took about 150 pieces of artillery, two fortified camps and two fortresses, fought sixteen actions and captured twenty forts, all without a reverse, in five months. The author's account of these operations could hardly be improved on

in the space at his disposal. Sir Hugh Rose succeeded Sir Colin Campbell as Commander-in-Chief, held the command for five years (1860-1865), and on his return to England became Baron Strathnairn of Strathnairn and Jhánsí (the capture of Jhánsí, April 1858, being one of his most noted successes), and subsequently Field-Marshal. He died in October 1885, at the age of 84.

The author's designation of the Mutiny as "primarily a military rising" requires more modification than he allows. The complete occupation of Lucknow is dated 20th March 1858 on page 42 (in a very convenient tabular analysis of the war), and as 21st March on page 82. "Joan of Arc" (footnote, page 145) is time-honoured, but no longer quite authoritative for the Maid of Orleans, Joan Darc. "Interregnum" appears to be used on page 42 to denote cessation of hostilities. In place of a general map of India, one specially designed to illustrate the operations would have been preferable. There are two excellent portraits. A pleasing feature of the work is the generous, yet discriminative, praise of many individual heroes of the Mutiny war.

The Races of the Old Testament. By A. N. Sayce, LL.D. Religious Tract Society, 1891. Pp. 180. *Price* 3*s.*

The oldest geographical document in the world is the tenth chapter of the Book of Genesis, the truth of which all recent critical research is elucidating. Using the results of such research, and especially the materials of "that prince of living excavators and practical archæologists, Mr. Flinders Petrie," Dr. Sayce, himself in the front rank of experts, works out the ethnology of the tenth chapter through what can no longer be termed the prehistoric peoples. The marvellously lucid details he sums up in a Table of the Races of the Old Testament, which may be accepted as a working basis for students, to be corrected and amplified by the many discoveries which archæology and Biblical criticism will yet make year by year. The book, which is most creditable to the Society that publishes it in its admirable series, "By-Paths of Bible Knowledge," has a fine frontispiece, the "Ancient Races as portrayed on the Egyptian monuments 3000 years since," besides numerous other pictures of heads.

A la Conquête du Chad. By Harry Alis. Paris : Hachette & Cie., 1891. Pp. 296.

The author of this volume has closely interested himself in the expeditions of M. Crampel and Lieut. Mizon, and in the other French expeditions taking part in the so-called "race to Lake Tsad." His book gives a very good summary, not only of the progress of these expeditions, but also of French aspirations in that part of Africa. The prospect of founding a great French African Empire is to him a patriotic vision ; but we fear he describes it only too accurately when he exclaims, "*Quel rêve manifique!*" The obliquity of vision which more or less afflicts "patriots" is conspicuous in his case. It is amusing to read his special pleading for a continuous zone of French territory—which of necessity must shut off the other European Powers from the Interior—based on the *Hinterland* principle. The French have in this way throttled more than one European Possession in North-West Africa—notably the British colony on the Gambia—and are now indignant because obstacles are thrown in their way to the indefinite expansion of their Congo Territories northwards to Lake Tsad. As to the real value of the possession of these lands in the Central Sudan, this has been sufficiently shown by the pacific diplomatic expedition recently despatched by the Royal Niger Company to Bornu. The expedition was courteously received, but sent "empty away" : the Sultan distinctly told them that *no* European Power should

establish a supremacy over him and his people except by force of arms. The reader may judge for himself how long it will take before such an eventuality can be realised. The disaster to the Crampel expedition, and the opposition offered to the advance of M. Fourneau and of other expeditions, are lessons to be taken to heart. The Royal Niger Company, at any rate, have avowed their intention of developing their present possessions rather than exhausting their strength by Quixotic attacks against the strongholds of Islam in Africa.

M. Alis devotes most of his space to an account of M. Crampel's two journeys, in which he was chiefly interested, to the journey of Lieut. Mizon, and to the elaboration of a French programme for North-West Africa. M. Crampel's plucky attempts to penetrate from the Congo basin northwards to Lake Tsad deserve commendation. In his first journey he did some good geographical work in the basins of the Ivindo and Djah, and by his discovery of the sources of the N'Tem, which would appear to be the head-waters of the Campo. He, of course, made treaties by the way. His second expedition, from which he has not yet returned, whilst reports speak of its total dispersal and even of the assassination of himself, was of a more ambitious character—to journey from the French Congo Territories to Algeria, by way of Lake Tsad and the Air Plateau. The rough map which M. Alis publishes in illustration of these journeys, gives some fresh information, especially concerning the banks of the Mobangi, between the station of Bangui and the river Kwango. It should also be mentioned that the eight geographical positions determined by M. Lanzière indicate the Mobangi as reaching as high a latitude as 5° 11′ N.

We have left ourselves no space to refer to M. Mizon's expedition. But we must protest against the unfair charges which M. Alis makes against the Royal Niger Company, who befriended M. Alis and his companions, although they must have been perfectly well aware that the object of the expedition was distinctly political and aimed against the Company.

The volume is handsomely produced, and is well furnished with illustrations. The maps are poor, however.

Het Kongo-Land en zijne Bewoners in Betrekking tot de Europeesche Staatkunde en den Handel. Door Dr. H. Blink. Met een Kaart van den Kongo-Staat en aangrenzende Landen. Haarlem: H. D. Tjeenk Willink, 1891. Pp. xi + 195.

The Dutch have been interested, at least commercially, in the districts around the estuary of the Congo since the days of Prince Maurice of Nassau, Governor of Brazil—that is, the early half of the seventeenth century. At the present time they possess several flourishing trading posts or factories in the same part of the World. The principal trading association, "The New African Commercial Company," alone has seventy-five such factories distributed along the course of the Congo, one as high up as Stanley Falls. According to an abstract from the *Bulletin Officiel* of the Congo Free State, printed by Dr. Blink, Holland in 1889 took from that State exports to the value of £245,100 out of a total value of £342,900, or 71½ per cent. of the whole. Thus the Dutch are interested in knowing about the Congo region. Dr. Blink's *Het Kongo-Land*, though primarily intended for his own countrymen, will be useful also to all and sundry who desire to be acquainted with that portion of Africa. It is a critical account of the geography and history of the Congo basin, the adjacent regions, and the coast-lands contiguous to the mouth of the great river. Dr. Blink writes fairly and sensibly when discussing the politics of the European governments in reference to

the partition of Africa, and offers a warm defence of the policy of his country in refusing to sign the General Act of the Brussels Anti-Slavery Conference. The geographical description embraces accounts of the coast, the basin of the Congo, its climate, flora, fauna, inhabitants, and commerce. A special chapter is devoted to the town of Banana; and another, very brief, to a summary of the statistics and condition of the Congo Free State. Dr. Blink's conclusions, after carefully weighing the evidence as to the suitability of the Congo Free State as a home for Europeans, are to this effect: "This part of Africa will certainly never be a region suited for colonisation by Europeans. But practical experience teaches conclusively that Europeans, provided they take necessary precautions, can live there and lead an active life for a number of years." And he goes on to point out, what reason would indorse, that not all districts alike are equally dangerous; those that lie higher and those that are reached freely by the fresh sea-air are by no means unhealthy.

Usambara und Seine Nachbargebiete. Von Dr. Oscar Baumann. Berlin: Dietrich Reimer, 1891. Pp. 375. Maps and Illustrations. *Price* 12*M.*

Dr. Oscar Baumann, who is favourably known to geographers in this country for his work on the West Coast of Africa, was, in the year 1890, despatched by the German East Africa Company to survey and report on the most valuable of their territories: namely, Usambara, and the neighbouring lands. That he acquitted himself with credit was only to be expected; but he has done more than that: he has produced a monograph on his subject that might serve as a model for future treatises of the kind. Nothing could be more admirable, nothing more valuable to the political executive, than such a report as this. If the other European Powers having possessions in Africa were to follow the example of the German Company in this respect, and be equally fortunate in the choice of their agents, we should soon have a series of monographs on African Lands that would be of inestimable value. Dr. Baumann has set about his task in a thoroughly scientific spirit, and with the requisite knowledge at his command. We have first, a general view of the physical and political conditions of that portion of German East Africa. This is followed by a closer and closer inspection of the lands and the people, their manners and customs, etc. Finally, the accomplished author gives his views—and they are very moderate views—of the economical prospects, from a colonial standpoint. There can be no doubt that Usambara, the Paré highlands, and neighbouring districts are valuable possessions, and, now that a railway is to connect them with the coast at Tanga, are likely to prove profitable, if only the German administrators are equal to their responsibilities.

The original maps accompanying this work by Dr. Baumann, largely from his own surveys, are a most valuable feature; they are admirably and carefully constructed, and artistically reproduced. There are several appendices, including the reports on Dr. Baumann's scientific collections.

Afrika. Eine Allgemeine Landeskunde. Von Prof. Dr. Wilhelm Sievers. Leipzig und Wien: Bibliographisches Institut, 1890. Pp. 468.

Professor Sievers has produced a most serviceable and, in every respect, admirable handbook of Africa, richly furnished with maps and illustrations. He deals with his subject in a thoroughly scientific spirit, and the manner of treatment is throughout excellent. We have first a complete account of the discovery and exploration of Africa, the more modern part being based on Dr. Supan's admirable review, which has proved so serviceable to others.

After taking a general view of the continent and its leading characteristics, Prof. Sievers deals in successive chapters with surface-features, climate, the flora and fauna, the indigenous population, the native States and the European colonies and spheres of influence. The book concludes with an excellent chapter, accompanied by a most useful map, on commercial relations and intercourse.

Throughout the work Professor Sievers has followed the most trustworthy guides in the various departments of geographical science. He quotes at considerable length from their writings and from the experiences of travellers, but always with good effect. Evidently his reading has been wide and has been well-digested. Wherever we have examined the text we have found it accurate; though of course, in the case of purely political references, a work on Africa is no sooner published than it is out of date.

Though not exhaustive, and not to be compared in this respect with Reclus' *Universal Geography*, this useful manual gives a well-balanced and fairly complete account of the geography of Africa. The author has, moreover, had the priceless advantage of having at his disposal all the resources of the Bibliographisches Institut at Leipzig, which accounts for the low price at which the volume is sold. Thus, many illustrations and some of the maps are old friends. The maps themselves—some of which are taken from the famous Berghaus' *Physical Atlas* (Gotha: Justus Perthes)—are all that could be desired. They are unsurpassed in their scientific accuracy and in the beauty of their reproduction.

South Africa, from Arab Domination to British Rule. Edited by R. W. Murray, F.R.G.S. With Maps, etc. London: Edward Stanford, 1891. Pp. 223.

Patch-work volumes on South Africa are becoming very common, now that there is a "boom" there. But Mr. Murray's *South Africa*, although it cannot escape being catalogued among books of the above description, has distinct merits of its own. In the first place, he has secured a chapter from so well known a writer as Professor Keane, who leads off with a long account of the early history of discovery in Africa, more especially of Portuguese action in South Africa. Professor Keane lays a large number of writers under contribution, and enters into some detail concerning such controversial subjects as the results of Portuguese explorations and their attempts at administration. His contribution is in itself of some value, but cannot be regarded as impartial. Mr. Murray, the editor, supplies two chapters, dealing with the European Settlements south of the Zambezi; but for the most part his descriptions are interrupted by running commentaries, and are far from complete: we learn next to nothing of the gradual development of Dutch and British rule in South Africa. The extracts from Dapper's *Africa*, relating chiefly to Monomotapa and to other reputed or reputable Native States, as exhibiting our knowledge of them towards the close of the seventeenth century, will be appreciated by those who have not access to the original work. Mr. Ellerton Fry describes the advance of the British South Africa Company's pioneer force into Mashonaland, in which he took part; and the volume concludes with some notes on the East Coast. It will be observed, therefore, that the information we get is very fragmentary, and apparently without system. The most valuable feature of the book is the maps. Two old maps have been beautifully reproduced by Messrs. Stanford: Pigafetta's map of the southern part of Africa (1591), and Jacob van Meur's map to Dapper's *Africa*. There are also a large Political map of South Africa, another showing the territory claimed by Portugal prior to the recent Convention with Britain, and a map illustrating Mr. Ellerton Fry's paper.

Italian Explorers in Africa. By Sofia Bompiani. London: The Religious Tract Society, 1891. Pp. 202.

These sketches, by an Italian lady, are reprinted from the *Leisure Hour*. Though slight and all too brief, they may prove of service to English readers. The Italian explorers and travellers in Africa have mainly confined their attention to the Eastern Horn and the Red Sea Littoral. In their own sphere of influence—though that sphere is rapidly shrinking, and will shortly be confined, it is said, to Massawa—and in the Nile basin they have done excellent work. We have only to mention the names of Miani, Piaggia, Casati, Gessi, Matteucci, Cecchi, Chiarini, and Traversi, to recall the merits of Italian travellers in Africa. The authoress claims Savorgnan de Brazza as an Italian, though the World to-day continues to regard him as a Frenchman. The truth is that he is the former by birth and the latter by choice.

These sketches have been carefully compiled, but the English translator has too slavishly followed the Italian transliteration of African names.

The American Siberia. By J. C. Powell. London; Gay and Bird, 1891. Pp. 355.

The author of this volume, for many years captain of the Florida Convict Camp, gives the results of his experience of the management of convicts. The gruesome stories with which his pages abound sufficiently show that the convict system in America, at least in his time, was about as imperfect as it possibly could be.

Les Races Humaines. Par le Dr. R. Verneau. Paris: J. B. Baillière et fils. n.d. Pp. 792. Avec 500 figures. 11 *frs.*

This handsome volume should by appreciated by students; it is arranged in the form of a dictionary, which makes it easy to consult or to compare references, and it is admirably illustrated. The first part deals with the principles of anthropology, the second with prehistoric man, and the third gives a very complete account of the human races. Mr. A. de Quatrefages supplies a preface. We have nothing but praise to give the author for the admirable manner in which he has performed his task. The book is one of the well-known series, *Les Merveilles de la Nature.*

Weather Forecasting for the British Islands by means of a Barometer, the Direction and Force of Wind, and Cirrus Clouds. By Captain Henry Toynbee, F.R.A.S., F.R.G.S., F.R.Met.S., late Marine Superintendent Meteorological Office. London: Edward Stanford.

This little manual is a reprint of the lecture delivered to seafaring men at various ports in 1888 and 1889. It gives an admirable elementary exposition of the relation between winds and the distribution of pressure, and shows how a local observer with a knowledge of this, and in possession of the forecast issued for the day by the Meteorological Office, may effectively supplement the forecast by observation of the movements of his own barometer, and of any cirrus clouds visible at the time. It is only by some such systematic local application of the general forecasts that the full benefits of a national organisation for meteorological observation can be obtained.

The illustrative maps and diagrams are well selected and carefully executed. Altogether the manual is such as will prove an excellent handbook for any one who wishes to use his barometer with success.

Arnold's Abridged P.-T.'s Year Books of Memory Books. London : Simpkin, Marshall, and Co. ; Leeds : E. J. Arnold.

The knowledge of topography which, as a necessary basis for the study of geography, is now required of pupil-teachers, has been found to be most easily obtained and secured by practice in drawing maps from memory. This atlas is a collection of outline maps, in which the outlines are carefully and boldly drawn and the leading natural features simply and clearly indicated in a manner which pupils can successfully copy. For purposes of reference the names of important places are entered. The general hints as to memory map-drawing and the directions for individual maps and the fixing of lines of latitude and longitude are well-considered and clear. The series is certainly one of the best of the kind, and will prove of much use to pupil-teachers.

The Statistical Year Book of Canada for 1890. Compiled by Sydney C. D. Roper. Ottawa, 1891. Pp. 628.

Canada is about to enter on a remarkable year—1892, the 400th anniversary of the great discovery of Columbus, the 100th anniversary of the convocation of the first Parliament of Upper and Lower Canada, and the 25th anniversary of Canadian confederation. The present volume, in the sixth year of issue, will be of value as a foil to its successor of the current year, with the new census results. In fourteen chapters the great Dominion, its geographical, administrative, and social features, is described and accurately set before us in official figures. Canada is the largest of the British possessions, being very nearly the half of the whole Empire, with an area of 3,456,383 square miles. This is little less than the whole continent of Europe, and is a fifteenth of the whole World with its 51,238,000 square miles. The chapter of most social interest is that on the Red Indians, showing how they increase under the just administration of Canada, which is such a contrast to that of the United States. We marvel that the Government of Canada does not follow that of British India, in adopting the administrative divisions of the International Statistical Congress.

The Natural History and Antiquities of Selborne, with Observations on various Parts of Nature, and the Naturalist's Calendar. By the late Rev. Gilbert White, A.M. Edited with Notes, by Sir William Jardine, Bart., F.R.S.E., F.L.S., etc. With numerous Illustrations. (Sir John Lubbock's Hundred Books.) London : George Routledge and Sons, Limited, 1891. Pp. xxviii. + 475. *Price* 3*s.* 6*d.*

It is quite needless to say anything in praise of this, one of the most delightful popular works on natural history in the English language. It has long been a favourite, and the present edition, well printed, well illustrated, and with an exhaustive index, leaves little to be desired in the way of mechanical production. To arouse the interest of the young in the habits of the commoner forms of life, as they occur in this country, no better book need be sought for, and in this, its latest form, it ought to make a useful and welcome present. Sir John Lubbock has supplied a short introduction, in addition to the more elaborate prefatory matter by the late Sir William Jardine.

ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
ASIA
BEHRING SEA
ALASKA
United States Territory
DOMINION OF CANADA
GREENLAND
Behring Strait
Wrangell
C. Barrow
Prince of Wales I.
St. Lawrence I.
Alaska Pen.
Kadiak I.
R. Yukon
Ft. Yukon
C. Bathurst
Banks Land
Prince Patrick I.
Parry Islands
Melville I.
North Devon
Melville Sound
Ft. Albert
Land
Boothia
Arctic Circle
Great Bear Lake
Great Fish or Back's R.
Chesterfield Inlet
Sitka
Queen Charlotte Is.
British Columbia
Vancouver I.
Victoria
New Westminster
Fraser R.
Ft. Simpson
Ft. Churchill
Nelson R.
York Factory
Lake Winnipeg
Battleford
Calgary
Regina
Manitoba
L. Nipigon
HUDSON BAY
Grant Land
Hall Land
Ellesmere Land
Hayes Peninsula
Greenville
Holstenborg
Godthaab
Davis Strait
BAFFIN BAY
Hudson Strait
Southampton Id.
Labrador
Cape Chidley
Cape Charles
NEWFOUNDLAND
St. John's
Gulf of St. Lawrence
Prince Edward Island
Cape Breton I.
New Brunswick
Fredericton
Halifax
Anticosti I.
Cape Race
Iceland
Jan Mayen
170
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SKETCH MAP OF
NORTH AMERICA
SHOWING APPROXIMATELY
THE EXTENT AND VALUE OF
ITS GEOGRAPHICAL SURVEYS
1891
EXPLANATION OF COLOURING
Area of General Topographical Surveys
Scale 62500 and smaller
Topographical & Geographical Reconnaissance Surveys, Travellers' Route Maps
General Geographical Sketch Maps
largely approximate
Unexplored Country
GREENLAND
ALASKA
DOMINION OF CANADA
UNITED STATES
MEXICO
CENTRAL AMERICA
WEST INDIES
SOUTH AMERICA
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE ART OF OBSERVING.[1]

By John Coles, F.R.A.S.,

Map Curator, and Instructor in Practical Astronomy and Surveying, Royal Geographical Society.

In the remarks that I am going to make on the art of observing, I intend to confine myself entirely to observations which can be taken with portable instruments, such as the sextant, transit-theodolite, telescope, plane table, prismatic compass, and instruments for determining heights by measuring the pressure of the atmosphere. I am well aware how difficult, in the time at my command, it will be to do anything like justice to my subject, and at the same time to deal with it in such a manner as to command your attention. I trust, however, that I may succeed to some extent in doing so.

Now, the art of observing with such instruments as I have mentioned is by no means difficult to attain. It consists of an acquaintance with each of the instruments and its adjustments, a knowledge of what to observe, and how and when to take observations, so that the best results may be obtained, and errors eliminated.

If an explorer, provided with a sextant, artificial horizon, and a good watch, were travelling in an unexplored country, the first thing he would want to know would be his position on the earth's surface, and to do this it would be necessary that he should find his latitude and longitude. Unless he succeeded in this, he might indeed describe the country he passed through, and in this way furnish some information to cartographers, but he would not be able to do more than give a rough approximate of the positions of important places, and characteristic features of the country. Now, with the aid of a diagram (Fig. 1), I think I can show you that finding the latitude by meridian altitude is a very simple operation.

[1] Read at Meeting of British Association, 1891.

In the first place, we have the fact that a heavenly body attains its greatest altitude when on the meridian above the pole. We also know that the elevation of the pole above the horizon is equal to the latitude of the place. These facts are capable of easy proof, but I must ask you to accept them as facts in the same manner as you would a statement that the distance of the sun is about 93,000,000 miles from the earth. Now, as we cannot see the pole of the heavens, and therefore cannot observe its altitude, we must find some other angle equal to its elevation above its horizon that we can measure, which we do in the following

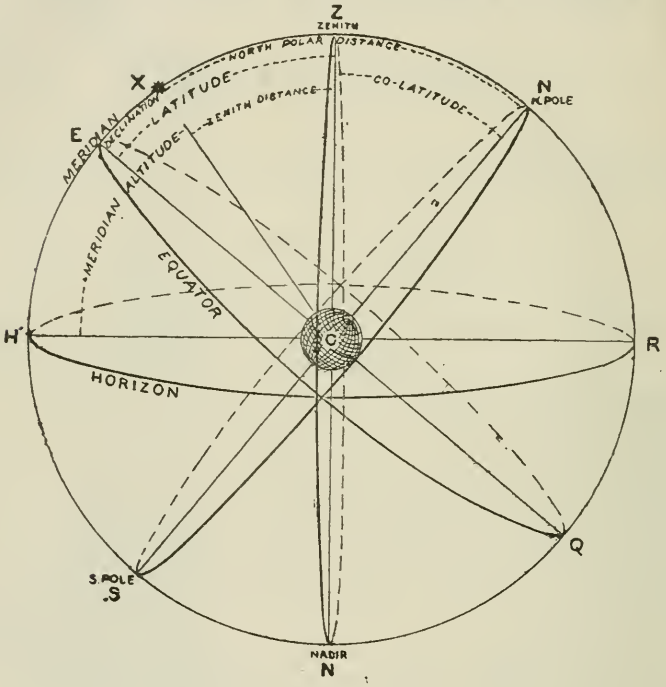

Fig. 1.

manner:—You will observe that the horizon is at right angles to the zenith, and that the equator is also at right angles to the pole. Therefore these two angles are equal one to the other. Then we may say that the angle ZCQ is equal to the angle NCH, and we therefore strike out ZN the co-latitude, which is common to both. Again we see that the angles RCQ and ECH are equal to one another because they are vertical and opposite; we may therefore also strike them out, and we have the angle ZCE equal to NCR, which is equal to the latitude of the place. Now, with a sextant or other angular measuring instrument we measure the elevation of the sun, or other heavenly body, above the horizon when it is on the meridian. If we take the altitude from ninety degrees, we get its distance from the zenith. Then by turning to the *Nautical Almanac*, at the proper page, we can find its declination, which is its

distance north or south of the equator. In the case before us you will see that this declination, added to the zenith distance, will give the whole of the angle which is equal to the elevation of the pole above the horizon, and therefore equal to the latitude of the place. I must here mention that there are certain corrections to be applied to the observed altitude before we get the true altitude. These are index error, refraction, semi-diameter, and parallax. In the case of a star, the only correction necessary beside index error is for refraction, and these refraction

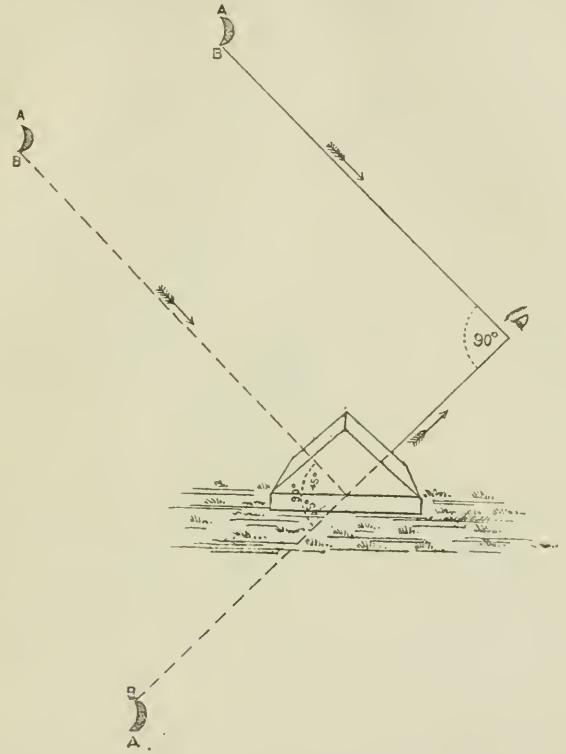

Fig. 2.

corrections are given in tables in all works dealing with practical astronomy. Now, the result obtained from one observation of the meridian altitude is likely to be somewhat in error, and it is here that the art of observing comes in. For if we observe the meridian altitudes of two bodies on opposite sides of the zenith, and at equal, or nearly equal altitudes, all errors of altitude of whatever kind will be removed.

I have several times mentioned the horizon, but away from the sea, unless in the neighbourhood of a large lake, we could not of course find any natural horizon that would answer our purpose. We must, therefore, make use of a substitute, which is in name, as it is in fact, an

artificial horizon. Any fluid that will reflect the image of a celestial body will answer the purpose, and I have taken very satisfactory observations in a pool of water on a perfectly calm night; but when there is the slightest wind such makeshifts are not available, as so much motion is given to the surface that it is impossible to make accurate contacts. One form of artificial horizon, and that which is generally used, is simply an iron trough filled with quicksilver, and sheltered from the wind by a sloping glass roof. Now when observations are taken in an artificial horizon the image of an object reflected from a horizontal surface appears as much below the horizontal line as the object itself is above it; hence the angular distance which we measure with the sextant gives double the altitude, and must therefore be divided by two. If you will look at the diagram (Fig. 2), I think you will see this at once. The roof should be changed, end for end, between each set of observations, to obviate, as far as possible, any errors caused by defects in the glass.

If a transit-theodolite is used, all observations should be made in pairs, with the face of the vertical circle alternately to the right and left of the observer, and the mean of two such measures will be free from all instrumental errors. There are many other ways of obtaining the latitude by observations of heavenly bodies not on the meridian, but in the time at my disposal it will be impossible for me to call your attention to these. I will therefore now proceed to say something about finding the longitude, but in the first place I will say a few words about finding the time, as longitude is really nothing more or less than the difference of time between two places.

We all know that the earth revolves on its axis from west to east in twenty-three hours and fifty-six minutes nearly, and, owing to this movement, all the heavenly bodies appear to revolve in the heavens from east to west. In consequence of this perpetual revolution of the celestial bodies, the hour angle, or distance from the meridian, of any one of them, affords the measure of time. The body observed should be nearly east or west, because when on the prime vertical, errors, of latitude of the observer, and of the altitude observed, produce the least effect on the hour angle. I must here, however, observe that, owing to the uncertainty of refraction, especially in very hot or very cold weather, no observation should be taken at very low altitudes. In latitude sixty degrees and upwards one minute error of altitude must always cause more than ten seconds error of time, but in the Tropics the time may more often be correctly determined when a body is less than an hour from the meridian than when at several hours from it in high latitude.

With these preliminary remarks I will now call your attention to the diagram (Fig. 3).

You will observe that the sun is represented here as being at some distance from the meridian. We measure its altitude above the horizon with the sextant, or some other angular measuring instrument. This, subtracted from ninety degrees, will give its zenith distance, which forms one side of our triangle. We then, after having corrected the declination, subtract it (in this case) from ninety degrees, which gives the polar distance of the object, which is another side of our triangle.

Again, by subtracting the latitude from ninety degrees, we get the co-latitude, which forms the third side of our triangle. Then, by a well-known formula, we compute the angle at the pole, which is equal to the hour angle, or the distance in time of the sun from the meridian. Now if we have with us a watch on which the error on Greenwich is known, we can find our longitude by simply comparing the local time that we have thus found, with the time at Greenwich when the observation was taken. Again, in this case, the art of observing comes in. For a single observation for time is often liable to considerable error, but if we observe

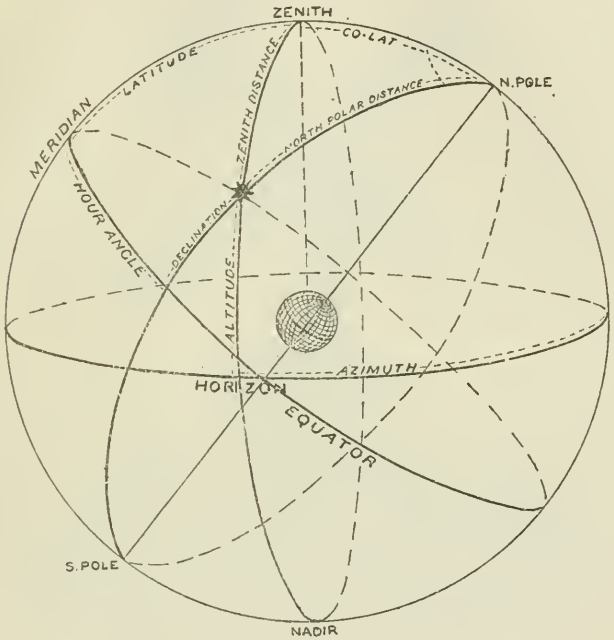

Fig. 3.

a body, or bodies, east and west of the meridian, at nearly the same altitude, the mean of the result will be free from error, or nearly so.

The next observation for longitude, to which I am going to call your attention, is that derived from occultations of stars. This is the best of the absolute methods of finding longitude, and I will describe the manner in which the observation is taken.

The moon, in its monthly revolutions round the earth, frequently passes between the earth and a fixed star, so as to intercept the spectator's view of the latter. The disappearance of the star from this cause is called an immersion, and its reappearance from behind the moon is called an emersion. A list of these phenomena is given in the *Nautical Almanac*, with the limit in latitude beyond which a star cannot be occulted by the moon. As the elements refer to the moon and the stars as they would be seen from the earth's centre, they serve equally for all places on the

earth's surface. When a traveller has decided to observe an occultation, he should, during the day, find the approximate local time of that phenomenon by applying the assumed longitude in time to the G. M. T. of conjunction in R. A. of the moon and star, which he will find among the elements of occultations in the *Nautical Almanac*. An hour before the time so found he should point his telescope to that limb of the moon by which the star will be occulted. It is necessary to take this precaution, as his assumed longitude, and therefore his time, may be considerably in error. The moon will be seen to approach the star from west to east until its eastern limb will reach the star and occult it. He must then note the instant when this takes place. After a certain interval the star will reappear on the other side of the moon. He should note this time also, but either of these observations is sufficient to determine the G. M. T., and thence the longitude. When a star is occulted by the moon's dark limb, the observation will afford the most decisive results, and indeed the phenomenon takes place so suddenly that it is quite startling. It will be thus seen that the observation is a very simple one, and is taken with a telescope, an instrument every one can use, and which is not liable to get out of adjustment. The computation, however, is somewhat lengthy; but this should not deter any traveller from taking the observation, as, if he has recorded his facts and time correctly, he can easily get it computed by some competent person on his return home.

I may here remark that the observation of the emersion would be considerably facilitated if, previous to the immersion, the star is made to travel along the horizontal wire of a transit-eyepiece, which will then indicate very nearly the place on the moon's limb where it will reappear.

I will now speak of longitude by moon culminating stars. For this observation a transit-theodolite, or small transit instrument, is necessary, which must be placed in the meridian. There are several methods of doing this, but the best is by high and low stars. It can also be approximately fixed in the meridian by computing the time of the meridian passage of a star and following it with the telescope until the time of its computed meridian passage, and clamping it in this position. If local time is not accurately known, the true meridian may be found by stars east and west of the meridian.

I have here an instrument, called a solar compass (Fig. 4), by the aid of which the telescope can be very readily placed in the meridian. It consists, as you may see, of a small telescope and level, the telescope being mounted on standards between which it can be elevated or depressed. The standards revolve round an axis, which is fastened to the axis of the larger telescope. Two pointers are attached to the small telescope to be used in approximately setting the instrument, and are so adjusted that when the shadow of the one is thrown on the other, the sun will appear in the field of view.

To use the solar compass, we take the declination of the sun, as given in the *Nautical Almanac*, for the given day and hour, and correct it for refraction. We now incline the larger telescope until this amount is shown on the vertical arc. If the declination of the sun is north we

depress it; if south elevate it. In south latitude this is reversed. Then, without disturbing the position of the larger telescope, bring the solar telescope horizontal by means of its level. The two telescopes now form an angle which equals the amount of the declination. Without disturbing the relative positions of the telescopes, set the vernier of the vertical arc to the complement of the latitude of the place. By moving the larger and solar telescopes around their vertical axes, the image of the sun will be brought into the field of view of the solar telescope, and after actually

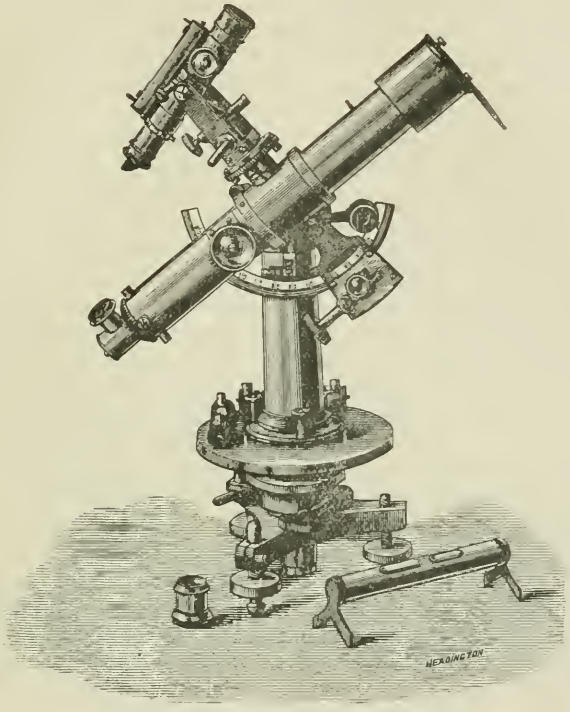

Fig. 4.

bisecting it with the solar telescope, the larger telescope must be in the meridian, as the solar telescope is in fact a small equatorial.

If the instrument is to be used with stars at night, all that is necessary, to test the accuracy of the adjustment, is to get some well-known star in the field of the solar telescope, keeping the larger telescope clamped, and see if after an interval, it still continues in the centre of the field: if it does, the larger telescope must be in the meridian.

There are, so far as I know, only two of these instruments in this country, though they are frequently used in the United States. One of these is in the possession of Mr. Alfred Maudslay, and was used by him with great success in surveying, and finding the longitude by moon culminating stars in Guatemala. The other is the one in my possession, which I have frequently used for the same purposes during the past three years.

I got both of these instruments made, with some modifications to make them suitable for star-observing, after the pattern of an instrument in the possession of my friend Mr. Josiah Pierce, of the United States Coast Survey.

In the observation for longitude by moon culminating stars, we first note the times of the passage of the moon's bright limb over the wires of a transit-eyepiece, and then the times at which the star transits over them, or *vice versâ*, if the star transits first. Now, as the R. A. of the star is accurately known, and for practical purposes nearly unchangeable, we can by applying the interval between the transit of the moon's bright limb and the star, obtain the R.A. of the moon's bright limb at the instant of observation, and then, by means of a very short computation, we are able to find the longitude in time. Very accurate results have been obtained by this method by Mr. W. Ogilvie in the Mackenzie and Yukon region, in British N.-W. America, for which he was this year awarded the Murchison Grant by the Council of the Royal Geographical Society.

We next come to finding the longitude by the eclipses of Jupiter's satellites. This observation is taken with a telescope, and is a very easy one. It also has the advantage of giving Greenwich time at once without any calculation whatever, as the Greenwich time of the eclipses is given in the *Nautical Almanac*. I have found, however, by frequent trial, that the results obtained from a single observation cannot be depended upon within forty seconds or a minute, but when the immersion and emersion of the same satellite are observed on the same evening, the mean of the two results may be near truth. As a rule the first satellite is to be preferred, as its motion is more rapid than the other three. This method, though easy and convenient, is not very accurate, as the eclipse is not instantaneous, and the clearness of the air and the power employed affect considerably the time of the phenomenon.

Another well-known method of finding the longitude is by lunar distances. The *Nautical Almanac* gives the predicted angular distance of the moon from the sun, planets, and certain bright stars for every three hours of Greenwich time, and if the traveller accurately measures this distance with the sextant, he has the means of determining the Greenwich time when the distance was observed. This sounds very simple, but this class of observation is open to the following objections. The moon, making her monthly circuit in the heavens, may be considered as the traveller's standard clock, but the operation of determining the exact Greenwich time by it is very much the same as it would be from a clock that had only an hour hand. Again, the moon only moves among the stars her own diameter in an hour, and therefore the observer must determine the position of the moon within the 120th of her diameter, to arrive even within half a minute of the true Greenwich time; and when he succeeds in doing this, his longitude would still be seven and a half miles in error. The observation is also a difficult one, and has often to be taken in a constrained position, and it must be exact to give anything like favourable results, as an error of one minute in distance produces twenty-five minutes in longitude, or the effect of fifteen seconds error of distance will produce six minutes of longitude, and this, be it

remembered, under the most favourable circumstances. From this we may see that a single set of lunar distances, even when taken by an experienced observer, is of comparatively little value. But here again the art of observing comes in, and if several sets be taken east and west of the moon, the errors produced on one side have a contrary effect to those taken on the other, and thus in the mean results they neutralise one another. As an instance of this, I may mention that Consul O'Neill fixed the longitude of Blantyre, to be used as a secondary meridian by several hundred sets of lunars, for which he received the Gold Medal of the Royal Geographical Society. Few travellers, however, possess Mr. O'Neill's skill, and fewer still, I fancy, can be found who are prepared night after night in a sickly climate, to spend the time, when others are asleep, in measuring lunar distances. All that I can say in their favour is this, that the opportunities for observing them are of more frequent occurrence than for occultations, moon culminating stars, or the eclipses of Jupiter's satellites. But they require far more skill to take, and, as a whole, can hardly be said to give satisfactory results, unless taken by a practised hand who thoroughly understands how to balance his observations.

There remains one observation of considerable importance, which is that for finding the error of the compass. This observation is very much like that which I have previously described for finding the time, and, by aid of the diagram (Fig. 3), I think I can explain to you how we find the true bearing of a heavenly body.

We observe its altitude above the horizon, and, in the same manner as before, we subtract it from ninety degrees to get the zenith distance. Then, by a well-known formula, we compute the angle at the zenith, which will be equal to the distance in degrees of the heavenly body from the meridian, which, being north or south, will at once give us the true bearing of the heavenly body. Having previously taken the bearing of this body with our prismatic compass, by comparing the compass bearing with the true bearing, thus found, we are at once enabled to ascertain its error. This observation is of considerable importance, as all bearings taken with a compass require to be corrected for this error before the true bearing can be obtained.

We will now pass on from astronomical observations to those that are taken for fixing detail in a map. I will first speak of the manner in which the heights of certain features in a country are fixed. The most accurate of these is by triangulation, but as it hardly comes within my province to enter into the details of a trigonometrical survey, I will therefore pass on to the method of finding the difference of height by means of the mercurial barometer.

Now in the first place there is considerable difficulty in conveying a barometer filled, from one station to another, as, owing the vacuum in the tube, the mercury when set in motion begins to pump, and, more frequently than not, knocks the end out of the tube. Many attempts have been made to get over this difficulty, and we have several barometers now which can be carried with comparative safety, even in a rough country. The first of these that I will mention is George's barometer.

In this case we carry empty tubes, and fill them by a cool process when we arrive at the point where the observations are to be taken. In temperate climates and at moderate elevations this can very conveniently be done, but at the top of a mountain, standing among the ice and snow, it is a very trying operation.

There is then another barometer, the Boileau-Mariotti, which is an extremely portable instrument, requiring no filling, and giving very excellent results.

The manner in which the observations for height are taken with a barometer is as follows: A reading of the barometer is taken at the lower station, and also the temperature of the air in the shade. This is repeated again at the upper station, the elevation of which we desire to discover. With these two readings and the mean of the temperatures, we are able to ascertain, with approximate accuracy, the difference of level between the two stations.

The aneroid is also very generally used for this purpose, and the observation is precisely the same as that taken by the mercurial barometer. It is, however, liable to mechanical disturbance, and cannot be relied upon for heights above 10,000 feet. A very good plan when observing heights with aneroids is to take two, one of which should be so constructed that it only commences to work at the point where the other leaves off. Wherever the aneroid is used, it should always be checked by the boiling-point thermometer, by which means any great error that may have been caused by a blow or a jerk will be at once perceived. The boiling-point thermometer itself is a very useful little instrument for determining heights. It is not, however, to be relied upon within 100 feet. This I have put to the test on many occasions. Once I carried on a series of observations with a boiling-point thermometer at two distant stations with a scientific friend. We both had Greenwich time and took our observations simultaneously, and we found that, after a fortnight's daily observations, there had been a variation of nearly 100 feet from the true height of the upper station. However, at great elevations 100 feet does not matter very much, especially as the height would only be determined by a boiling-point thermometer in a preliminary survey.

I am now going to introduce to your notice two instruments which are peculiarly adapted to the wants of travellers, and the use of which could be very easily taught in schools: these are the plane table and prismatic compass. The plane table is simply a piece of wood on which paper is stretched, mounted on a tripod. The alidade is fitted with two sight vanes, and the instrument is also furnished with a long compass needle in a box. Now, by referring to the diagram (Fig. 5), you will see how this is used.

In the use of the plane table it is absolutely necessary, when the table is set up at any station, that it should be oriented—that is to say, its sides must be parallel to the position which the same side of the table had on a previous station. This may be done approximately by the compass needle, but where possible it should be oriented by placing the edge of the alidade on one or more rays that have been drawn on the paper, and turning the table until the sights come on with the object itself.

The great advantage of using the plane table is that the map is actually constructed on the board while the work of surveying is going on,

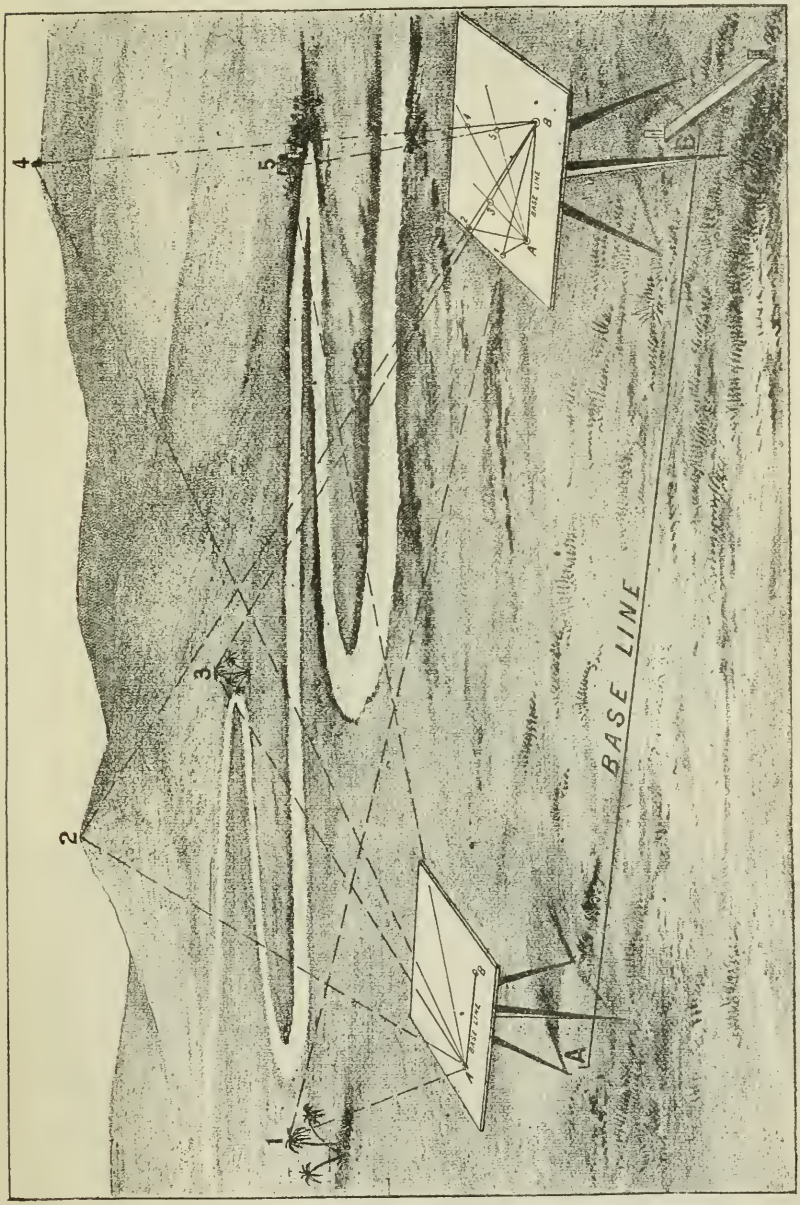

Fig. 5.—Illustrating the manner in which the Plane Table is used.

and thus all considerable errors are detected at once. You may also see that being simply a piece of board mounted on a strong tripod, any

part of it can easily be repaired, should it become broken or temporarily disabled.

The prismatic compass is the most portable of all surveying instruments. The manner in which the survey is made is similar to that of the plane table, the only exception being that the results are taken down in a note-book, instead of being drawn, as in the case of the plane table, on the paper in the field.

We have a diagram here (Fig. 6) which illustrates the manner in which a survey through a jungle can be plotted.

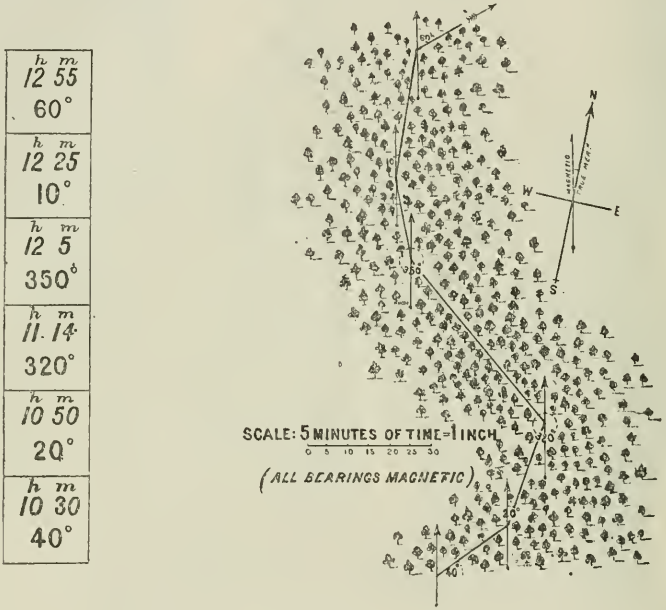

Fig. 6.

In this case you will see that a scale is given of so many minutes of time by the inch, and the reason for adopting this method is that in a rough country, or one where the traveller is constantly turning about in the jungle, it would be impossible for him to arrive at anything like an accurate estimate of the number of miles that he had travelled over. But, by taking the time occupied to travel from one point to the other, he at any rate keeps up a just proportion all through his survey. Mr. Holt Hallett made a journey of more than 1000 miles through parts of Burma, Siam, and the Shan States, during which he adopted this method, with remarkably accurate results.

A simple and rapid method of making a rough survey of a limited area is shown in the diagram on the next page (Fig. 7).

It consists of taking bearings with the compass, and measuring the distances with the Weldon range-finder. The manner in which this system is carried out is as follows: A flagstaff is driven into the ground in some convenient position, to which a surveying chain or measuring

tape is attached by a ring. From this point the bearing of the object is taken, and then, by means of the first prism of the range-finder, a staff is set up at a right angle to the line joining the flagstaff and the object; the observer then retires, keeping the two staves in a line until, in the second prism of the range-finder, the object and the flagstaff appear in one. He has then only to measure his distance to the flagstaff, and this, multiplied by fifty, will give him the distance of the object. The Weldon range-finder is no larger than an ordinary watch, and has three prisms; one is accurately constructed to 90° for setting out right angles, and the other two are 88° 51′ 15″ and 74° 53′ 15″ respectively. Of

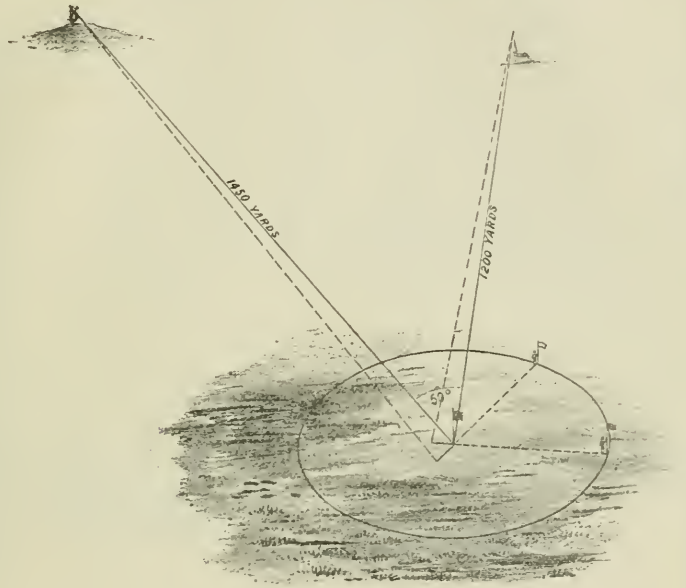

Fig. 7.

course with a sextant set to these angles the same work could be done, but the range-finder has the advantage of being much more portable, and not liable, as the sextant is, to get out of adjustment.

I will now, with your permission, make some remarks on the projections most suitable for travellers, for, although map projection does not come under the head of observing, it is nevertheless a kindred subject, as it is on a map that the results of such observations as I have mentioned are exhibited. For any place within the tropics Mercator's projection is the most suitable, chiefly from the fact that a straight line drawn through any part of it will intersect all the meridians at the same angle, thus showing correctly all the relative bearings.

If you will look at the diagrams on which the same line is plotted, you will see that in the case of the Mercator the track appears as a straight line, intersecting all the meridians at the same angle, while on the conical projection a straight line would intersect each meridian at a

different angle, thereby rendering it a much more complicated matter to accurately lay down a track, or to take from it the bearing of one place from another. And again, while the distances can be accurately measured

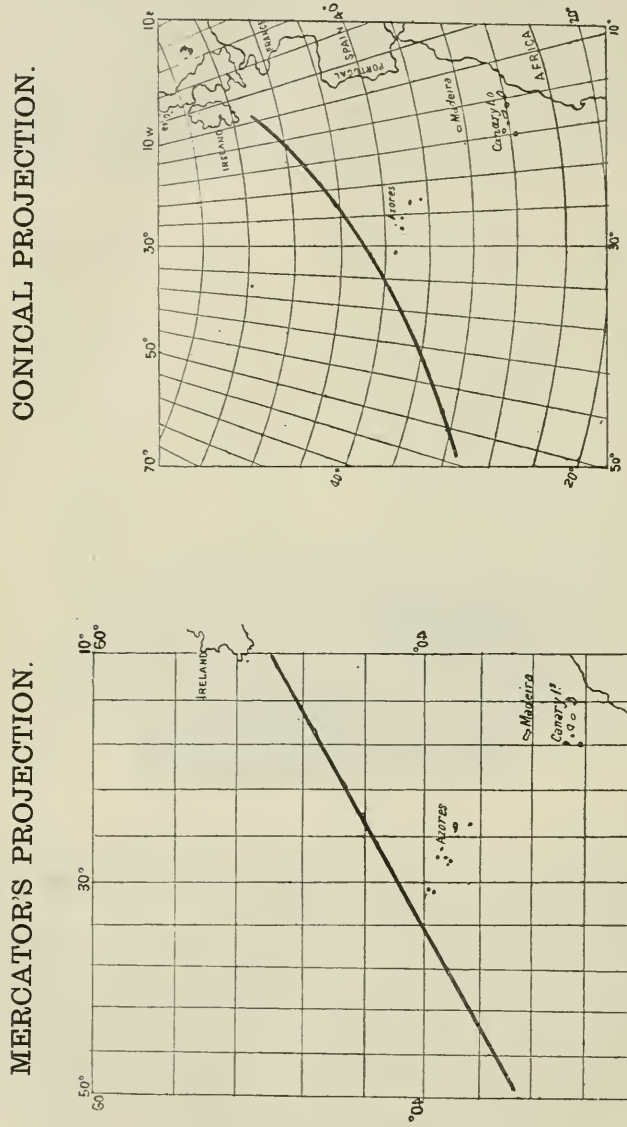

Fig. 8.

on a Mercator's projection, when taken from the graduated meridian with the middle latitude between the two plans as a centre, the same degree of accuracy cannot be attained on the conical projection; and the general distance scale given on such maps, if the area included is

extensive, is only an approximate. I may mention in this connection that I have measured distances on the Admiralty charts, which are all on Mercator's projection, between distant points, for determining the length of telegraphic cables; and when these distances were afterwards actually measured, by the number of miles of cable laid, I have never found them to be in error. At any great distance from the Equator, Mercator's projection greatly exaggerates the lengths of the degrees of latitude and longitude, and therefore gives a false notion of relative areas, and for this reason a modification of the conical projection may be preferred in some cases, but by the well-known system of "squaring in" the work on the Mercator's projection can be transferred to another map, where it will be shown in its true proportions. Time will not permit me to dwell further on this subject, or I could give other reasons for my preference, for rough survey work, for this useful projection.

I have now brought my paper to a conclusion. I have endeavoured to touch, however lightly, on the art of observing as it should be practised by travellers, and in this connection I would remark that it is greatly to be deplored that many of the well-educated and intelligent men who visit little-known countries, fail to make themselves acquainted with the manner in which observations, for fixing their positions, should be taken and recorded, the consequence being that, instead of contributing valuable information to geographers, they have frequently nothing more to tell us than that they have made big bags of game, and have seen lakes, rivers, and mountains, the positions of which on the map they can only assign by guess-work. As regards two of the instruments to which I have referred, the plane table and the compass, I feel sure that surveying in the field with them would form a valuable branch of instruction in our schools, and would give pupils a more perfect knowledge of the manner in which maps are made, and surveys are carried on, than they can gain in any other way.

ON ACCLIMATISATION.

By Robert W. Felkin, M.D., F.R.S.E., etc.

(*Read at Meeting of British Association*, 1891.)

For many reasons the subject of acclimatisation is an important one, and its interest increases yearly. New areas are coming under European influence, and statesmen are naturally anxious to know of what use they will prove; whether they will only be useful in a strictly commercial sense, or whether colonisation will be possible, and if so, where and to what extent? Again, the World's population is rapidly increasing, and, according to the paper which the President of this Section, Mr. E. G. Ravenstein, read before this Association in Leeds last year, unless some great catastrophe happen, we may look forward to a time in the comparatively

near future when the population of the World will be so great that it will be almost impossible to obtain subsistence, even should the whole area of the World become inhabited by an evenly distributed population.

During the last few years the subject of acclimatisation has been frequently referred to. I would call to mind the paper read by Dr. A. Oppler before this Association in 1887; Mr. Ravenstein's paper on "The Lands of the Globe still available for European Settlement," read in 1890; a paper read by Sir W. Moore before the Epidemiological Society in January this year, "Colonisation of Central Africa by Europeans;" a paper I myself read on the same subject at Birmingham in 1886; a paper published by Professor Virchow in the *Zeitschrift für Ethnologie* 1885, accompanied by an important discussion in which Bastian and Fritsch took part; a communication on the "Acclimatisationsfähigkeit der Europaer in Asien," by Professor A. Sprenger, published in the same journal. The subject of acclimatisation is also referred to by Herr Joest in a paper on his journey in Africa in 1883 (*ibid.*); and in 1886 various other important communications were published in the *Zeitschrift für Ethnologie*, viz.:—a paper by Dr. Beyfuss on "Die Acclimatisation der Europaer in Niederlandisch-Indien;" one by F. Jagor on "Der Sterblichkeit der Eingeborenen und Europaer in Ost-Indien," which was followed by a discussion; and a very important paper by Dr. August Hirsch on "Acclimatisation and Colonisation." These are all I need mention.

I find it, therefore, very difficult to say anything fresh on the subject. This is my misfortune, not my fault: I would not myself have chosen to introduce this discussion; but, having been requested to do so, I will endeavour to indicate what acclimatisation is, and what the difficulties of acclimatisation are, and I must apologise if I only echo much that has been said before.

When we look at the opinions that have been expressed on the subject of acclimatisation, we find that we can divide them into two schools of thought—one regarding acclimatisation as impossible, which view is supported by Virchow, Hirsch, Fritsch, Ravenstein, and others. Without going into detail, they hold that Europeans can never become acclimatised in the full sense of the word in Tropical regions, thinking that the deterioration caused by climatological factors and endemic diseases will invariably either kill off the emigrants, or at any rate render their ultimate existence impossible. Others, as De Quatrefages, hold that Europeans can become acclimatised anywhere. They, however, allow that the process of acclimatisation will be accompanied by severe loss, and will only occur after several generations. Others again are far more sanguine, such as Livingstone and the late Bishop Hannington, who thought that rapid acclimatisation in Tropical regions is possible for Europeans. I may state at once my own view of the subject. It is that, although we have at the present day examples of nations who have become acclimatised in areas far from their original habitat, hundreds of years have been required, and an immense mortality has accompanied their migrations, and it has only been by a process of the survival of the fittest that this acclimatisation has been possible at all. I believe, however, that our increased knowledge of climatology and of hygiene has rendered the problem more easy of solution.

Given picked individuals, and the careful selection of tropical areas in which to colonise, I see no reason why, with precautions, Europeans should not colonise even in the Tropics; if he

> ". . . Study well the clime,
> Mould to its manners his obsequious frame,
> And mitigate those ills he cannot shun."

I may mention in passing that a very careful selection would need to be made, and that persons with a tendency to gout or rheumatism, diabetes or albuminuria, those with a nervous or alcoholic family history, or those suffering from either acquired or hereditary syphilis, should certainly be rejected.

When speaking of the subject of acclimatisation with reference to Europeans, we are very apt to fall into the error of imagining that all Europeans can be acclimatised or will resist acclimatisation in any given area equally. This is undoubtedly a mistake, for a marked difference obtains between northern and southern Europeans in this respect, and not only the climatology of their original residence must be taken into account, but also their habits and customs and their psychical peculiarities; and if these factors have to be considered with regard to the adaptability of a nation for emigration, so too with regard to the individuals of any nation. It is a fact that selected individuals from nearly every European nation may thrive almost all over the world. It has been denied that environment influences the human species, and it has been said that nations seek out that environment which is best suited for them. These statements I feel bound to deny, and I would say that environment definitely influences not only individuals but nations. This Herbert Spencer has shown in his *Principles of Biology*, where he demonstrates that every organ and every function of living beings undergoes a certain and definite modification within certain limits under the stimulus of new conditions; and he further opines that this modification is almost always such as to produce an adaptation to a new environment.

Broadly speaking, it must be admitted that Europeans can only become readily acclimatised in the Temperate Zone, that is to say, where climatic and other conditions are approximately akin to their present habitat. We may say too that the people who inhabit the Temperate Zone become more easily acclimatised in countries towards the north of their present habitation; and this is shown by the fact, if we are to credit it, that during the past 2000 years the Aryans have penetrated from the Tropics to the region of ice and snow within the Arctic Circle. Apart from this, however, as Mr. Ravenstein has shown, "if the white man is ever to occupy permanently the Tropical parts of the world, it will have to be done by stages, each stage making a generation of men. We well know that the peoples of southern Europe, such as the Italians and southern Frenchmen, can better bear the climate of sub-Tropical Africa than can northern Europeans. A steady stream of migration is, in fact, setting in that direction. Germans and Belgians are pouring into France, Frenchmen are going to Algeria, the Arabs from the shores of the Mediterranean have found their way into the Sudan, whilst the Sudanese are pushing forward into

Bantu Africa. A similar movement is going on in southern Africa. The descendants of those Dutchmen who, a couple of hundred years ago, first settled at the Cape, have made their way to the Transvaal, and European migration, favoured by geographical features, is being pushed even within the Tropics towards the Zambezi." With this I quite agree, and would once more call attention to the fact that wholesale, immediate acclimatisation for Europeans in Tropical regions is entirely out of the question.

There is little doubt that southern European nations would be able to colonise in the Tropics were the physical constitution alone to be taken into account; but temperature also plays a definite *rôle* in the possibility of prolonged existence in a given region, and it is a quality which especially requires time to be modified to new conditions of life. Hereditary temperament and capacity of mind variously characterise all nations, and differences of intellectual and moral power are well-marked factors in the possibility of acclimatisation. It is these factors which to a great extent limit the power of southern Europeans to thrive in the Tropics, whereas northern Europeans, though physically less able to withstand Tropical influences, are yet in possession of a more stable temperament, and greater strength of character, which will go far to enable them to overcome the difficulties incident to a sojourn or a settlement in the Tropics.

The acclimatisation of Europeans in the Tropics can only be successful if migration occurs step by step; and in estimating the possibilities of acclimatisation we must count by generations rather than by years. In 1861, it is true, Dr. Hunt denied this, saying that "time is no agent," and "if there is no sign of acclimatisation in one generation there is no such process." This, however, cannot be accepted, because there are many instances to prove the contrary.

What happens with regard to animals? We know that they can be acclimatised, and we know how their bodily structure is modified in order to enable them to adapt themselves to a new environment. It is not necessary to quote instances, they are so well known, but the following quotation from the last edition of the *Encyclopædia Britannica* shows the practical way in which an animal or plant may be acclimatised in a country very dissimilar from that of its native habitat, and where it has been experimentally proved that the species in question cannot at once live and maintain itself:—

"1. We must transport as large a number as possible of adult healthy individuals to some intermediate station, and increase them as much as possible for some years. Favourable variations of constitution will soon show themselves, and these should be carefully selected to breed from, the tender and unhealthy individuals being rigidly eliminated.

"2. As soon as the stock has been kept a sufficient time to pass through all the ordinary extremes of climate, a number of the hardiest may be removed to some more remote station, and the same process gone through, giving protection if necessary while the stock is being increased, but as soon as a large number of healthy individuals is produced, subjecting them to all the vicissitudes of the climate."

It is obvious that we cannot deal with men exactly in this way, yet

there is no reason why robust and healthy individuals should not be chosen for experimental acclimatisation, and why areas should not be sought out, even in the Tropics, where the climatological conditions are not altogether unfavourable to the success of the experiment. Such areas are to be found.

We must now try to ascertain what we know of the results of attempts at colonisation by Europeans in the past. As Dr. Oppler pointed out at Manchester—"of 80 million Europeans and their descendants who live at the present time, no fewer than 10 millions have found a home within the Tropics (or rather within the isothermal lines of 58° F.). Of these 10 millions, fully 9 millions live in Tropical America."

We find that the Dutch adapt themselves to a Tropical climate; they live quiet and temperate lives, dressing lightly, doing their work in the early morning hours, paying great attention to the drainage of the district they inhabit, and to their sanitary surroundings. At the Cape of Good Hope, where they have been, so to speak, isolated for the last 200 years, and where they have intermarried very slightly, they are tall and robust, they have retained their fair complexion, and, so far as physical development goes, we may say that they leave nothing to be desired. They marry at an early age, and their families are large. This is proved by the increase which has taken place, for we find that, whereas in 1798 they were under 22,000, in 1865 they numbered over 180,000. Again, we know that in Tropical South America, Europeans have become acclimatised, and when the race is kept pure they seem to improve in all respects.

If we desire an example of a race thriving in extreme vicissitudes of climates, it is to be found in the Indians, who, coming from a Temperate region in North America, have become acclimatised in the hot dry coasts of Peru, and also in the extremely cold regions of the Andes, at an altitude of from 4000 to 6000 feet. Now, notwithstanding that the inhabitants of these two regions do not thrive if they are removed from one to the other, they have nevertheless proved the possibility of an original race becoming gradually acclimatised in areas which are totally different from a climatological point of view.

As Professor Virchow pointed out in 1885, we have two questions to consider. The one is—Can an individual become acclimatised? the second concerns the acclimatisation of a race. With regard to the first question, we have to ask—how long can an average and healthy European withstand a foreign climate? to what extent can he become accustomed to it? for how long can he adapt himself to his new environment, and in what measure is he capable of manual labour there? In reference to the second question, we have to ascertain if and how it is possible for a European emigrant to found a family, and so to adapt himself and his children to his new environment that they can permanently exist there? These questions are by no means easy of answer. As to the first, it is perfectly true that some picked men removed from Europe to the Tropics do particularly well. They do not suffer from the heat; malaria seems to have no power over them; they sleep well, notwithstanding the noises and nuisances of a Tropical life; and we find, as Sir William

Moore points out, that "some grow stout and some grow thin" and yet appear to adapt themselves individually to any climate. They experience good health, they are capable of any and every kind of work, and at a good old age they return to Europe apparently uninfluenced by the climatological vicissitudes to which they have been exposed. These individuals appear to possess more than the average of *vis vitæ*; and it is from them, in all probability, that the best Eurasians spring. Looking to India, I suppose it must be admitted that the Eurasians are not a degraded, miserable stock; but, superior to their mothers in mental characteristics, they are also superior to their fathers in physical development, in staying-power, and in vitality. This leads me to a remark, in passing, that it would be a great advantage were this class of Eurasians in India well cared for by the Government, and were legalised marriages between the two races encouraged, and the children of such unions fostered.

Dealing next with our second question, we are met with insuperable obstacles in coming to even an approximate answer. The main difficulty rests with the want of statistics; and although we find in Cuba, for instance, and in Jamaica, that there is an apparent increase in the European population; yet we cannot be sure that this increase is due to the increase of the acclimatised individuals, or whether it is not a fallacious increase due to an incessant influx of southern Europeans. These are all points which I have only briefly touched upon in order to open the way for a discussion on the subject, and to elicit if possible definite and instructive data.

It is surely a sign of the times that even insurance companies are not now averse to taking the risk of a Tropical residence. What would have been thought of an office fifty years ago which was willing to take such risks? Now, however, we find that one so important and well known as the "Standard" will insure men going to reside in India, Ceylon, the Straits Settlements, China (Shanghai, Hongkong, Peking, and all the Treaty ports), Japan, West Indies, and the Mauritius. This office has stood the test of time, and it is impossible to suppose that its managers would enter into such business were they not sure that the time had come when the probabilities of life in the Tropics were as capable of being estimated as they are at home. As a matter of course an "extra" is charged; but even so, it proves that residence in the Tropics is not so uncertain, so fatal, as it once was. A well-known actuary told me the other day that even with regard to the Congo Free State, he estimated that the extra to be charged was 10 per cent. This "extra" is certainly heavy, but "coming events cast their shadows before."

It is unfortunate that in this investigation so much must rest on supposition and deduction, and that we have so few definite statistics to guide us. Even with regard to the Anglo-Indian army, we have only systematic sanitary reports since 1865; hence, in considering Indian statistics, and the light they throw upon the health of Europeans in that country, we can only take as approximate the figures at hand. This notwithstanding, we find undoubted evidence that the mortality of the troops in India has decreased remarkably in recent years. In 1820, the

annual loss per thousand was 80 (I take these figures from a paper published by Surgeon-General Sir William Moore); in 1856 the loss was 58 per thousand. But, as Sir William points out, "in those days men were not invalided home with the liberality which now obtains; and when ordered home for change, they had to wait perhaps months for a ship going round the Cape, for there were no Indian troopers, and the Suez Canal was not constructed. Yet invaliding at this period raised the total loss to the service to 69 per thousand." The average loss from 1870 to 1879 inclusive was,—invaliding 43 per thousand, the death-rate 19·34. This rate was still further decreased in the succeeding nine years ending 1888, when the average invaliding was 34 per thousand, the average death-rate 16·03. But, as Sir William Moore again points out, this rate of mortality and invaliding is still far too high, and depends chiefly upon the immature soldiers who are sent to India. Surely the short-service system has much to answer for in this connection, for it is an admitted fact that soldiers should not be sent to the Tropics until they are fully mature, that is to say, between the ages of twenty-four and twenty-five.

However, the reduced death-rate proves that much has been done to rob a residence in the Tropics of its terrors, and, to my mind, it also indicates a time coming when science will render a more prolonged or permanent residence within the Tropics a practical possibility.

Of course, it is climate which exerts the greatest influence on mankind. As Forray says, "Climate constitutes the aggregate of all the external physical circumstances appertaining to each locality in its relation to organic nature;" or, in other words, H. T. Buckle says, "It is the influence exercised by physical laws over the organisation of society, and over the character of individuals."

The salubrity of a climate depends generally and chiefly upon (*a*) a moderate and comparatively equable temperature, (*b*) on a certain dry condition of the soil, (*c*) as Mühry pointed out, "in a minor degree on certain unknown 'endemi-physical' predispositions to peculiar morbid conditions."

In order to attain acclimatisation, in a hot climate we must have (*a*) an alteration in the quantity and quality of the blood to render it adapted to the needs of the individual (physiological anæmia). This can be, and usually is, attained in two years. (*b*) A climate is, we know, only healthy or unhealthy as regards the individual, as may be briefly illustrated by southern Europe being used as a health resort for phthisical patients; but in this connection races have a certain immunity from some diseases. Thus, Negroes do not suffer excessively from malaria, provided they remain in their own districts; but should they be brought to Europe, cold tries them greatly. (*c*) We must also take into consideration that, in the Tropics, some places are healthy, others unhealthy; for, as Lind said long ago, we can always, with due care, find comparatively healthy areas in any part of the World.

In considering Tropical climates, with reference to health, we must not forget that, although in some places the mortality is very high, it is so also in Europe, where we must take into account the various circumstances

which influence the salubrity or otherwise of a district. Persons inhabiting large towns are liable to many factors which act towards deterioration, and there the death-rate is far higher than it is in country districts. If we compare the death-rates of the various capitals of Europe, we find that marked differences obtain; for instance, the death-rate in London is one-third less than that in St. Petersburg or Moscow.

It would add too greatly to the length of my paper were I to indicate all the facts known with regard to mortality in various European cities and countries. I would, therefore, only call attention to the certainty that, where sanitary precautions are properly carried out, the death-rate diminishes exceedingly; and, comparing those towns in the Tropics which are under the influence of European knowledge, we find that the average rate of mortality compares very favourably with that of towns in Europe where sanitary precautions are less attended to.

It is curious to notice that, when Europeans proceed to countries possessing a very different climate from their own, their children in a generation or two receive an indubitable impress from the climatological factors around them. Take, for instance, the Europeans who go to North America, and we find that they tend to approach in type to the original inhabitants of the soil. They outwardly resemble the North-West American Indians. The hair becomes straighter, coarser, darker; the cheek-bones become more prominent, and the rounded form of the face changes into the gaunt, lined face which is typical of the inhabitants of the United States. The skin takes on a sallow complexion, the voice itself changes, and the nasal twang, so apparent to Englishmen, becomes pronounced. Again, if we look at the residents in Australia, we find very peculiar results are induced there. Supposing, for instance, that a woman proceeds to Australia, having already given birth to three or four children, the children she subsequently gives birth to in the new climate do not resemble her previous progeny so much as they do the Australian type.

Further, granted that the Anglo-Saxon race can maintain itself, and become acclimatised, as in Australia, New Zealand, and America, is it not probable that the race may undergo such changes as materially to alter those qualities upon which the worth of the race, so-to-say, depends? Are not the *Cornstalks* of Australia, the Anglo-New-Zealanders, etc., practically different from their ancestors, and do not they severally indicate a tendency to change to an altogether new type of manhood with new aptitudes and capabilities? But this very interesting question cannot be further discussed.

We have also to consider what effect the liability or otherwise to disease has with reference to the possibility of acclimatisation. (*a*) A lengthened residence gives strangers a certain immunity from such diseases as dyspepsia, and all that wide class of disease which is induced by plethora. It may be, too, although the fact is denied by some authorities, that the longer a European resides in some portions of the Tropics where yellow fever obtains, the less likely is he to suffer from that fever. (*b*) The probability of strangers suffering from certain diseases is heightened by the length of residence. For instance, a person is far more

likely to suffer from malarial fever, and all those chains of symptoms induced by malarial intoxication, the longer he resides in a district where malaria is rife. In this connection, it must be noted that, although a person himself may be obnoxious to the influence of malaria, yet it is indisputably proved that his children will be susceptible in a very marked degree to the debilitating influence which malaria exerts upon the organism. (*c*) We must also not lose sight of the fact that there are certain diseases which strangers are only likely to suffer from after a prolonged residence in the Tropics. This depends more or less upon the amount of cachexia affecting the individual, and such diseases as yaws or elephantiasis can only make their appearance in those who have resided for so long a time in the climate in which they are indigenous that certain climatological factors have so far impressed themselves upon the individual that a predisposition to the disease is induced. With regard to these diseases, there is reason to hope that within a very few years a method of prophylactic treatment may be evolved which will prevent their occurrence at all. Indeed, with regard to elephantiasis, the researches which I have been able to make seem to show that it is a preventible, and even curable, disease. (*d*) There are finally certain diseases which only occur in children of the second generation. They occur after dentition, and are of an atrophic character. Up to the present time nothing has been done to control these diseases, yet I am convinced that if during pregnancy the mothers were properly treated, and if during the early years of child-life proper prophylactic medication were attended to, much might be done to save such children from the effects of environment and to fortify them so that they might bid defiance to the climatological factors which till now have either rendered their existence in the Tropics impossible, or have induced such a state of constitutional debility as to necessitate a return to Europe in order that they should survive or be prevented from becoming sterile.

Looking at the factor of heat, we have to think whether it is a high mean annual temperature or only a high temperature without any seasonal variation; because for Europeans, if we have a climate where the seasonal variation is 30° F., or over, we find that the people can do as well if not better than in Europe. In those places, however, where there is only a mean annual variation of 10° or 15° F., or where the diurnal variation is less than 10° F., immigrants cannot stand the climate. It is curious, no doubt, to speak of cold when dealing with acclimatisation of Europeans in the Tropics; but cold exerts a great influence on the capability of withstanding a Tropical climate. We find that in regions where, the mean annual temperature being equal, the diurnal variation is excessive, individuals from Europe cannot withstand this fluctuation; because, granted that a person is ready to perspire with the hot daily temperature, he cannot withstand the cold nightly variation which so often obtains.

With regard to endemic diseases, altitude undoubtedly plays a definite *rôle*: malaria, for instance, is far less virulent when we attain an altitude of about 3000 feet; and with regard to yellow fever, we know

that, at an altitude of over 1000 feet, it can never exert epidemic virulence.

Summing up what we know respecting the heat, the cold, and the diurnal variation of temperature in the Tropics, we come to the conclusion that it is impossible for any European nation to become acclimatised *at once* in any Tropical region; but we think that if the attempt be made step by step, generation by generation, it is not improbable that northern Europeans may become acclimatised in, say, 100 years, in Tropical India or Africa; and that if representatives of a nation were to endeavour to proceed gradually from a Temperate to a Tropical country, they might, in five or six generations, acclimatise themselves either to the north or to the south within 30 degrees of their original habitat.

In conclusion, it must be admitted that the permanent residence of Europeans in Tropical climates must be first attempted in those regions possessing a definite altitude—an altitude which will give them considerably less heat, less moisture, and a greater immunity from endemic diseases than low-lying plains.

AMONG THE MACHINGA PEOPLE.

By R. S. Hynde.

Domasi, one of the stations of the Established Church of Scotland Mission, in British Central Africa, lies on the northern slope of Mount Zomba, having on the west Mount Malosa (usually represented as forming one mountain with Mount Zomba), and with Lake Chirwa (Shirwa) about fourteen miles to the east. Its exact latitude is 15° 18′ 4″ S., and its longitude 35° 18′ 7″ E.

The station being, as I have said, situated on the northern slope of Zomba, with Malosa on the west, while a spur of Malosa looks down on it from the north, and having two small hills on the north-east, lies at the south end of a small valley. It takes its name from the river Domasi, which flows past it at a distance of about half a mile to the north-east. The Domasi is a mountain stream which takes its rise from two feeders, one on Malosa, the other on Zomba, and flows down the valley between the two mountains, cutting its way between the spur of Malosa and one of the small hills already mentioned. After a tortuous course it eventually discharges itself into Lake Chirwa. During the first half of its course it has a very steep gradient and a rocky bed, over which it flows with great rapidity. It falls very low in the dry season, but rises considerably in the wet season: hence the difficulty of bridging it. This rapid rise and fall is characteristic of all the streams of the Shiré Highlands.

Mount Zomba, as is well known, is about 7000 feet high, and Malosa is of equal height. There is nothing remarkable about either mountain unless it be the warm spring on the eastern side of Malosa, in which, however, the water is small in volume and of low temperature, and has no peculiar taste. Very different are the Morambala springs, which I

visited on my way up. They are three in number, and the water is too hot to hold the hand in. They have a strongly sulphurous smell. The summits of both Mount Zomba and Mount Malosa have an undulating outline, the former being from six to seven miles long, and Malosa of similar extent. Livingstone, who considered them as one mountain, guessed them to be about sixteen miles long. Their sides, where they have not been denuded by the natives, are covered with trees up to the base of the cliffs which surround them on all sides, giving them some similarity to Table Mountain at the Cape. The top is chiefly covered with short tufted grass and clumps of trees.

The Mlungusi stream, a tributary of the Likangala, which discharges itself into Lake Chirwa, rises in a marsh on the top of Zomba, which, in the rainy season, becomes a pool. Most of the streams of any magnitude that rise on Zomba and Malosa are perennial. The valley of the Domasi is largely used by the natives for growing Indian corn, which flourishes best at a high latitude, while most of the millet and all the rice are grown on the plain at the foot of the mountains.

The whole country, except where it has been cleared for gardens, is covered with wood, which may be forty to fifty years old. Large parts are occupied by the *Masuku* tree, which bears an edible fruit, a heavy crop appearing once in two years. The natives have till lately been living on the sides of the mountain (owing to fear of marauding tribes), and consequently the largest clearances are to be found there. Owing to more settled conditions, they are now gradually descending to the plain. As they do not manure their gardens, but plant a new plot every few years, they destroy a large number of trees. The wood is on the whole not large, generally from a foot to a foot and a half in diameter.

The grass on the plain is long and coarse, and reeds crop up wherever the ground is marshy. Here Indian corn and millet are grown in large quantities, and rice to a smaller extent. The country on the whole is fertile, as may be seen from the variety of products cultivated by the natives. They are—Indian corn, millet, rice, tobacco, cotton (of an inferior kind), sweet potatoes, a species of cucumber, water-melons, rubber, indigo (wild), pumpkins, yams, tomatoes, several varieties of beans, castor-oil plant, groundnuts, sem-sem, Indian hemp, bananas, papaya. The following have been introduced:—coffee (which fetches 112*s.* in the market), rubber, cinchona, sugar-cane, pine-apples, oranges, lemons, guavas, granadillas, pomegranates, Cape gooseberry, English potatoes, peas, and other European vegetables, all of which grow well. Of wild fruits found are the vine, fig, custard apple, and bramble, etc. Both the tobacco and the rice grown around Domasi are among the finest in the country. Tea has only lately been introduced, but appears to be doing well.

The year is divided into two seasons—a wet and a dry. The former lasts, roughly, five months, the latter seven. They are sometimes called respectively the hot and cold seasons. At Domasi the average temperature is about 80° F., and in the cold season about 70° F. The first rains usually fall in October. There is then a slight break till near the end of November. December, January, February, and March, are

usually very wet. April is the transition month from the wet to the dry season. From May till September it is usually very dry. The rainfall has not been measured at Domasi, owing to the want of a rain-gauge, but at Blantyre—fifty miles to the south-west—it has been recorded for some years. We hope to give at a future date a few of the results.

The tribe among whom we labour is a branch of the Ajawa or Yao race. The Yao or Ajawa may be described as a cross between a nomadic and an agricultural people. They consist of five branches:—the Makale branch, which is located to the north-east of Lake Nyasa; the Makata, who dwell about the middle of the east shore of the lake, at a place called Mwembe; the Masaninga, who reside under the chieftainship of Makanjila, towards the southern part of the eastern shore; the Machinga, now chiefly settled around Chikala Mountain, Malosa, and Zomba; and the Mangoche branch, who reside chiefly at Chirazulo and Soche, near Blantyre. They thus stretch under different names from near the lower Shiré to the sources of the Rovuma. Owing to their roving disposition small numbers of them are found in much more remote parts, and to the same cause must be ascribed the pretty fair uniformity of their language The Yao spoken at Zomba is easily understood at Mataka's town, though there are a few variations. In the laws and customs slight differences are noticeable, but they are comparatively small. Physically they are rather tall and well made, and have an erect carriage, which is specially characteristic of the women. No doubt it is a result of the universal practice of carrying things on the head.

As a people they are inclined to be haughty and intractable, but this is largely the result of their intercourse with the coast and to the large number of black traders to be found among them. In the Shiré Highlands, where this influence is now almost *nil*, they are quite tractable, take readily to work, and are among our best scholars in the schools.

On the other hand, it was the Mataka Yaos who murdered the two Portuguese in 1890, and who destroyed all Mr. Johnston's (of the Universities' Mission) property some years previously. It was the Masaninga Yaos who in 1888 stripped and robbed H.M. Acting Consul, Mr. Buchanan, and this same Mr. Johnston; but then they are so much contaminated by black Arab traders that this is little to be wondered at. Livingstone, before they were so affected by Arab influence, was invariably well treated by them, especially by the predecessor of the present chief Mataka. So much has their intercourse with the coast increased of late that Swahili is freely spoken at their capitals on Lake Nyasa.

The population is scattered round the hills, Chikala (about fourteen miles north-east of Zomba), Malosa, and Zomba, in small villages composed chiefly of related families. Sometimes a village consists of only five or six houses, more commonly twelve or twenty, and rarely above thirty. The chief's village at Domasi consists of more than a hundred houses, but that is an exceptional case. These villages occur at intervals of a quarter or half a mile. The chief of course is paramount, and settles all cases of importance, his subordinates settle minor cases in their own districts, while each headman decides petty cases in his own village. The chief's council is composed of experienced men, who stay at his

village and "wait at the council-yard," of the head-men of his neighbourhood, and, of course, the parties interested in each case.

The old chief, Malemya, used to be at the council-yard nearly every morning by six A.M. to hear cases, and usually sat till eleven or twelve o'clock. In the event of an important dispute the court-yard would be crowded, and, as each important speaker made his point, his associates or supporters would clap their hands in African fashion,[1] and one special man would chant, often not ceasing even during a speech, in a nasal tone rising to a higher key while the clapping was going on. After each side had urged its case the chief's own men would take up the argument, and either one of them or the chief himself would give the final decision.

It requires a man of no ordinary ability to arbitrate in such cases as are brought before the council, for frequently they are of many years' standing, and the judge, not having any books to refer to, must learn and keep before his mind the history and ramifications of the dispute. In fact the chief is usually a man pre-eminently gifted, both physically, mentally, and, according to their light, morally too.

It frequently happens, however, when the chief does not give an impartial decision, that the offended party, having no higher court to appeal to, decamps bag and baggage to another chief, and as a chief's power consists in the number of his subjects, the loss of a man is a serious matter.

Domestic slavery is in full force among them, but slaves are usually well treated lest they, too, should run away to a neighbouring chief. By doing so they would not necessarily become free, but they would change masters, possibly for the better. Slaves intended for sale are of course treated in the usual way. They are put into slave-sticks, or otherwise confined, and sold to the first passing caravan. As Livingstone foretold, however, legitimate trade and facilities for work would, by supplying native wants, soon put an end to the practice; and so it has turned out. Wherever the missionaries or the traders have firmly established themselves it has gradually languished, and in such districts will soon be a thing altogether of the past.

The special hardship of domestic slavery lies of course in the fact that, if the master or some of his friends should get into difficulties, the slave, his wife, or his children, may be used to pay the fine, or one or more slaves may be exchanged for goods at the option of the owner. Formerly, perhaps five years ago, no less than two hundred people were disposed of to passing caravans in one year, in the Domasi district, many of them domestic slaves; but now this traffic is extinct, and the slaves merely change hands to a small extent in the country itself. It is a frequent custom also to sell offenders who merit the punishment of death, rather than kill them.

As a rule domestic slaves are well treated, and in outward appearance cannot be distinguished from the freemen. The freemen, however, show the pride of class, and one man boasted to me that his family had so much, so to speak, blue blood in their veins that "even when they were drunk" they never cast at each other the epithet of "slave."

[1] By hollowing the hands and bringing them together longitudinally.

Descent is reckoned through the sister; hence the son does not inherit position or property, but the nephew, the son of the eldest sister. The tribe seems to be in the transition stage between the matriarchal and the patriarchal systems. Each person belongs to a clan, and is not allowed to marry into his own clan. Hence (to use Highland tribal names by way of illustration), if a Macgregor man marry a Stewart woman, the children are not Macgregors but Stewarts. Therefore, if a Macgregor is to succeed he must be the son of a sister of the late proprietor, for even although she marry a Campbell her children are Macgregors. Daughters, therefore, are a greater source of strength to a village than sons. The daughter never (in ordinary circumstances) leaves her mother's village. If a man wants to marry a woman, he sends a go-between to the girl's father to arrange matters. No payment is made. If the parents' consent is obtained, that is sufficient; the girl has often no voice in the matter. The fathers of the bride and bridegroom meet at the former's village, and a fowl is cooked and eaten, which act makes the contract legal. The bridegroom then builds a house *at the bride's village*, and, as soon as it is ready, without further ceremony they live together as husband and wife. Hence a man with five sons would not, unless his sons should marry slave-wives, have a single house added to his village, whereas if he had five daughters, under ordinary circumstances, the five men who married these daughters would each build a house at his village.

The chief duty of the son-in-law is to help to hoe his mother-in-law's garden. One end which (designedly or not I cannot say) is served by this plan is that the wife's relations see that she is well treated, and not, for instance, sold as a slave. It is quite evident that a man living at a distance might marry ten wives (polygamy is practised), and take them away to his distant home where he could quietly dispose of those he did not wish to keep. Slave-wives go to their husband's village.

So far as we have been able to find out there is no trace of marriage by capture, nor are wives sold, as is the case south of the Zambesi. The women have usually little choice, as they are often betrothed when quite young. If, by any chance, a grown-up girl should be free, she may have the opportunity of choosing a husband. Notwithstanding these facts women are in a very subordinate position, but are allowed a considerable amount of freedom. There is no marked trace of any *taboo* system, though there are indications which, on fuller investigation, might point in that direction. The division of each tribe into families or clans with distinctive names, and the prohibition against marriage between persons of the same clan, is analogous to the *totem* system.

In religion it is difficult to state their beliefs, not only because they are reticent on the subject, but also because of the haziness of their ideas. They worship the spirits of their ancestors, especially chiefs and headmen. For the people generally there are burial-grounds away in the bush, but chiefs and influential headmen are buried in the centre of the village, and on certain occasions offerings of flour and beer are placed on the graves, and sometimes the spirits are addressed in exactly the same way as the living persons would be.

The Yaos have also a belief in a God of a very undefined nature. As to a future state or a heaven, beyond the mere idea that the spirits of dead people still exist, they do not appear to have any belief. They consider sickness and death to be caused by witchcraft exercised by a living enemy of the person bewitched, and consequently they have a poison ordeal by which the guilt of accused persons may be proved, or their innocence declared. It consists of a draught into which a poisonous bark has been put. The accused drinks the decoction, and if it causes vomiting, as it sometimes does, the person is innocent; if no vomiting occurs, the person dies, and in many cases his body is burned. The trial takes place before the people, in some place in the bush, and a great deal of excitement usually prevails.

The Machinga branch of the Yao tribe do not kill wives or slaves on the death of a chief or person of note, though their neighbours, the Mangoche Yaos, formerly did, and several others of the surrounding tribes still observe the custom. At the death of the late chief, however, one of his wives had to go down into the grave "to receive her husband," which done she came up again. This of course points to a former custom by which burying a wife alive was probably part of the funeral ceremony.

In burying they double up the body, bending the legs at the thigh and again at the knee, so that the corpse is buried in a sitting posture, with the chin almost touching the knee—a favourite position of the native in life. Most of the personal effects of the deceased are buried with him, and before being put into the grave they are broken. The reason of this is not evident, and one can merely give a conjecture. One idea which readily occurs is the old one that things have spirits as well as men, so that, when the owner is dead, they too must be broken that their spirits may accompany the owner. As I have said, however, they have no happy hunting-ground, as in the case of the Red Indian, which would lend colour to this explanation.

The men fire off guns and the women wail from the time of death till the time of burial. The firing of guns is ostensibly to keep off evil spirits, but is also used as a mark of respect. They fire guns at a birth, at the return of a caravan, at a death and burial, on visiting a grave, at the installation of a chief or head-man, and at beer-drinkings. The bulk of the powder used by such tribes is burnt in this harmless way.

Their language has been reduced to writing; and a grammar, and by no means complete vocabulary, compiled by the Rev. A. Hetherwick, M.A., F.R.G.S., has been published by the British and Foreign Bible Society, while another has been published by the Rev. Chauncy Maples of the Universities' Mission. As a language it has more affinities with Swahili than with the Zambesi-Nyasa group, and its nearest relation is the language spoken by the Makonde, a small tribe lying between the Yao and the Swahili. The literature in Yao consists at present of the four Gospels, the Acts, Romans, and 1st and 2d Corinthians (British and Foreign Bible Society), translated by Mr. Hetherwick, and two school-books by myself (published by the Church of Scotland), incorporating many of the native stories. There is also a grammar and Yao-English

Primer by myself, for use in the Yao-speaking schools (published by the Church of Scotland). Besides these there was Bishop Steere's collections for a handbook of the Yao language, now superseded by Mr. Hetherwick's Grammar. They have a large number of folk-lore stories, which are very similar to the Swahili tales issued by Bishop Steere, but more primitive. A collection of them is at present being formed, which may aid in showing the wide prevalence and similarity of animal stories among the Bantu peoples.

The Yao people have a traditional code of laws which, so far as they go, are excellent. Wholesale stealing, murder, and adultery are all capital crimes, but, of course, when the injured person consents, they may be atoned for by pecuniary compensation. Marriage is made legal in the way described above, but divorce is not hard to obtain. Polygamy is allowed. Land occupied or marked off is considered the property of the person who so occupies or marks it off. The judges, as already mentioned, are the head-men, the final appeal being to the chief, and freedom to plead is allowed to every man.

The native is by no means necessarily a lazy person. The men occupy themselves in hoeing, planting, building (houses only last two or three years), hunting, fishing, journeying, trading, attending palavers, and, since Europeans have come into the country, working for pay. The women especially cannot be called lazy. They have all the cooking to do, which is a daily task, and includes pounding and grinding grain, fetching firewood and water; they also hoe and help to plant, and they work on European plantations for wages. Births, deaths, and native ceremonies take up much of the time of both men and women. They have initiation ceremonies for both boys and girls and young wives, which are of an immoral character. Circumcision is practised at the boys' initiation ceremony.

Such is a short account of the people among whom we live and labour. It is by no means complete according to our present knowledge, which is extending every day. At no distant date it will be comparatively easy to give a tolerably exhaustive account of native life, and thus fresh light will be shed upon the development of native tribes, which will help the comparative study of the development of the human race.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The Annual Business Meeting was held in the Society's Hall, Edinburgh, on Tuesday afternoon, 10th November, at four o'clock. Mr. Ralph Richardson presided.

The following Resolutions were adopted :—

1*st*. On the motion of Principal Grant Ogilvie, "That His Grace the Duke of Argyll be re-elected President for the current Session ; and that the Vice-Presidents of the Society be re-elected.".

2*d*. On the motion of Principal Grant Ogilvie, "That the Honorary Office-Bearers of the Society be re-elected for the current Session."

3*d*. On the motion of the Chairman, "(*a*) That, in room of the Ordinary Members of Council retiring at this time by rotation, the following gentlemen be requested to serve on the Council, namely:—Lord M'Laren, Mr. J. R. Findlay, Mr. R. J. Mackenzie, Mr. Hugh Miller, Mr. David Patrick, Professor Crum Brown, Dr. John Kerr, and Mr. J. B. Sutherland; and (*b*) that the following Members of Council retiring at this time by rotation be re-elected, namely:—Dr. George Smith, Mr. William Jolly, Dr. James Burgess, Sir Robert M. Smith, Dr. Mill, Mr. J. W. M'Crindle, Mr. W. B. Blaikie, Dr. George Merry, Dr. Dods, Dr. Turner, Mr. Grant Ogilvie, and Sir J. N. Cuthbertson."

The Secretary submitted the Annual Report of Council, which, on the motion of Principal Grant Ogilvie, was adopted. This concluded the business before the Meeting.

The Anniversary Meeting of the Society was held on Thursday evening, the 12th November, in the Free Church Assembly Hall, Edinburgh. General Sir Robert M. Smith presided. Mrs. Bishop read a paper (which was illustrated by lime-light views) on "The Upper Karun Region and the Bakhtiari Lurs." A most cordial vote of thanks was awarded to Mrs. Bishop, on the motion of Professor Grainger Stewart.

The Glasgow Branch of the Society held its Inaugural Meeting on the following evening, 13th November. Mr. W. Renny Watson, Chairman of the Branch, presided. Mrs. Bishop repeated her address on "The Upper Karun Region and the Bakhtiari Lurs." Lime-light illustrations were given. Dr. Gairdner moved, and Dr. Muir seconded, the vote of thanks to Mrs. Bishop.

The Dundee Branch of the Society held its Opening Meeting on Tuesday evening, 17th November, in the University College. Captain Clayhills Henderson, who has succeeded to the Chairmanship of the Branch, Principal Peterson having resigned, presided over the Meeting. Dr. Hugh R. Mill delivered an address on "Regions and Races; the Foundations of Geography," which was illustrated by lime-light views. Principal Peterson moved the vote of thanks to the lecturer.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

The Aaland Islands.—Professor Cohen has visited these islands, and lectured on them before the Greifswald Geographical Society (*Globus*, Bd. lx. No. 10). Besides the main island there are about 3000 small islands and rocks. The area of the group is about half that of Rügen, and its inhabitants number 18,500, of whom 12,000 dwell on the large island. The waves have cut out innumerable bays and fiords in the coasts, separated by capes and promontories. Most of the islands are wooded. They are composed principally of porphyry, granite, and *Rapakivi*—a granite containing felspar crystals in large quantities; in the east gneiss also and slates are found. In the plain of Northern Germany, and especially in Pomerania, erratic blocks composed of rocks found in the Aaland Islands and the neighbouring parts of Scandinavia are very common. Stones and fossils from the formations of Gothland and Oeland are also to be seen in the neighbourhood of Greifswald. As these blocks were no doubt carried by ice during the glacial period, Dr. Cohen concludes that the glaciers moved from north-north-east to south-south-west.

Novaia Zemlia.—M. Nossilof, who has devoted so much time to the exploration of these islands (*S.G.M.* vol. iv. p. 605), spent last winter at the western entrance of Mathew Strait, in a house specially constructed after his own plans and brought from Archangel. Up to November M. Nossilof was able to make excursions into the Kara Sea, collecting birds and animals, surveying the coast, and taking soundings in the sea. The winter was unusually stormy, and the sea remained open until spring. Torrents of rain fell, so that the country was covered with a coating of ice, and the reindeer perished from hunger; hundreds of seals were frozen on the ice, and fish were thrown up in heaps on the shore. Changes of temperature occurred with great suddenness: from −31° F. the thermometer rose to +37° F. in a few hours. The spring and summer were correspondingly severe, and the temperature did not rise above 41° F. up to the end of July. Nevertheless, the scientific work of the expedition was carried on without interruption, and large zoological collections were made. This is the third winter M. Nossilof has spent in Novaia Zemlia. His next journey will be to the peninsula of Yalmal.—*Globus*, Bd. lx. No. 15.

ASIA.

Navigation on the Siberian Rivers.—Some details given in the *Compte Rendu*, No. 16, of the Paris Geographical Society on this subject are worthy of notice. Sixty-four steamers and one hundred and sixty-two lighters ply between Tiumen and Tomsk during the summer months, from about May 15th to September 28th, and transport about 74,000 tons of merchandise. The course of the Yenisei is 2450 miles long, of which 1850 are navigable, from Minusinsk to the mouth. Six steamers, a tug, and a passenger boat navigate the river, the chief ports being Minusinsk, Krasnoiarsk, Yeniseisk, and Turukhansk. Of the affluents of the Yenisei the Tunguska only is navigable. The Angara, 1100 miles long, is navigable from Lake Baikal to Fort Bratski, a distance of 460 miles, and from the barriers to the mouth. The Selenga is 740 miles long, and is navigable for a distance of 200 miles from the Chinese frontier. Lake Baikal is navigable from the end of May to the end of December, the Angara from the beginning of May to December, and the Selenga from the middle of May to the middle of October. Three steamers ply on Lake Baikal, four on the Upper Angara, and three on the Selenga, besides a number of lighters. The Lena, 2880 miles long, is navigable for 2680 miles from Yigalova, and is served by nine steamers. Lastly, in the Amur basin forty-five steamers run during five months, from April 30th to September 30th, which with their lighters can transport 7100 tons. The Amur is navigable for 1720 miles, the Argun for 430, the Shilka for 300, the Ussuri for 320, the Zeya for 530, and the Bureya for 330.

Siam and the Shan States.—*The Times*, September 3d and 5th, contains letters from a correspondent on these States and their relations with the British Government. The small States lying to the north and north-east of Chieng-mai, or Zimme, have long been a subject of contention between the Indian Government and Siam. The question is now nearly decided, and, at any rate, is of little consequence. Kiang-tung, Kiang-kheng, and Kiang-hung are larger, and their political position is not yet clearly defined. The first of these States lies to the north of Laos, and extends from the Mékong on the east to a little beyond the Salween on the west. Kiang-hung, still further north, lies on both sides of the Mékong, and borders on Chinese territory. Its eastern boundary is undetermined, but it is probably marked by the watershed between the Nam-hu and the Mékong. The third State, Kiang-kheng, lies like a wedge between the two former. Tribute has been paid by

Kiang-tung to the Indian Government, though it has not been formerly annexed. By itself, however, it would not be a desirable acquisition, projecting as it does like a long peninsula from the Burmese territory, and having a river for its eastern frontier. Kiang-hung has paid tribute at different times to all the surrounding states, but at present the only countries that can lay any claim to suzerainty over it are China and Burma. Tribute has been demanded by the India Government, but no response has yet been made to the request. Mr. Scott, however, after the completion of the Anglo-Siamese frontier delimitation, made a journey northwards, and has been warmly received in Kiang-hung. On his return further light will be thrown on the character of the country. Should these two States and Kiang-kheng, which undoubtedly belongs to Kiang-tung, be annexed, the boundary towards the French possessions would be a mountainous watershed, with no pass practicable for pack animals between Muang-sai on the south to a route lying further north than Kiang-hung. And not only would a good frontier be secured by annexing Kiang-hung, but the railway to Kiang-sen, proposed by Mr. Holt Hallett, might then be carried as far as the Chinese frontier to tap the trade of Yunnan.

Difficulties may also be expected before long to arise with regard to Siam. The Siamese are exceedingly lazy and addicted to gambling. The king and princes seem willing to remove abuses and introduce European civilisation, but the mass of the people, and even the ministers, are perfectly indifferent as to the kind of government they live under. Industry and progress are checked by the evils of serfdom, slavery, the farming of taxes, and corruption of justice. Meanwhile, Europeans are flocking into the country and introducing foreign labour. Should, then, these evils not be remedied soon, the question of annexation will be forced on those European Powers which have an interest in the country. France is advancing rapidly from the east, but will for the present be content with the Mékong as a boundary. In Siam proper there are already thousands of British subjects, and their number is increasing rapidly. It therefore behoves the Government to keep a watch on the progress of events, and be ready to interfere when the interests of British subjects are at stake.

AFRICA.

Cameroons : Lieutenant Morgen.—This traveller has given a preliminary account of his journey to Adamawa in the *Mitt. aus den Deutschen Schutzgebieten*, Bd. iv. Heft 3. Leaving the Kribi Station on June 20th, 1890, he proceeded to the Yaunde Station by a new route, passing through Biyoka, a village of a chief named Tunga. Here he and his party met with rather a cool reception, and in the dense forest through which they afterwards marched were shot at by the natives, without being able to retaliate, and were subjected to this annoyance until they reached the first Yaunde village, Atkatburo. On June 21st Lieutenant Morgen crossed the Nyong River, between Shumma and Msalla, here a quiet stream 100 yards broad, and on the 24th reached the Yaunde Station. At Ngila, a central point of the ivory trade, he, in conjunction with Herr Weiler, established a new station, to which the name "Kaiser Wilhelmsburg" was given. With regard to the configuration of the land-surface, Lieutenant Morgen states that the country for a distance of 50 miles from the coast is flat, and is raised only a few feet above the sea-level. Beyond the Lokunje there is a steep ascent to Tunga's village, 650 feet high, followed by a gradual slope. Eighteen miles to the west of Mabele commences the acclivity bordering the inner plateau, which has an elevation of about 2300 feet. The Elementen, a mountain near the Yaunde Station, has a height of 2950 feet; the Ngila mountain is 2900 feet high, and the Ngaundere

mountains as much as 4900 above sea-level. The plateau is drained by the rivers Nyong, Saunaga, and Mbam. The two steps of the plateau are marked on the Sannaga by the Idia and Herbert Falls, on the Nyong by the Neven du Mont Falls and some rapids to the south-west of the Yaunde Station, to which Lieutenant Morgen gave the name of "Tappenbeck." The Nachtigal Falls, which are really only rapids, lie within the limits of the plateau. Forests clothe the country as far as the place where Lieutenant Morgen crossed the Nyong, and from there to the Sannaga extends a park-like region, sometimes assuming the appearance of a savannah. The grass grows to a height of 16 feet, and amidst it are generally to be found dwarf trees (*Anona Senegalensis*). Game is remarkably plentiful, especially where there is water, as along the banks of the Sannaga. Elephants, buffaloes, antelopes, and guinea-fowl abound here. The inhabitants of the plateau are in an unsettled state, their land being encroached on by the Mpangwe from the south, the Mwelle from the east, and the Wute from the north. From Ngila, Lieutenant Morgen made an excursion in a north-westerly direction to Ngaundere II. (not to be confounded with Ngaundere I. in Adamawa), near the Mbam, having undertaken to assist the chief, Ngila, in an attack on this village, in return for which he was to be guided to Tibati. An attack of dysentery, aggravated by a wound, compelled Lieutenant Morgen to return to Ngila, where he soon recovered sufficiently to continue his journey as far as Yoko, the nearest village of the Tibati tribe. Here he waited four weeks for permission from the chief to enter the Tibati territory. At length he received permission to proceed to the Zanzerni, or military camp, situated four days' march to the south-west of Tibati, which he entered on December 1st. The inhabitants, 12,000 in number, were actively engaged in the slave-trade. Many of the victims came from the Cameroons territory, and were destined for Yola and Sokoto. The country beyond Yoko is a hilly savannah, sometimes assuming a mountainous character, as in the Njua heights, to the east of Zanzerni, which rise to an altitude of 3000 feet. On the way to Banyo (Flegel's furthest south) Lieutentant Morgen crossed the Mbam, and found it even so far up a stream 160 yards broad, with three or four feet of water in its channel at the driest season. He heard from the natives that it is navigable for boats and canoes still further up, and also down to Balinga, from which facts he anticipates that this river will prove of great service in the commercial development of the country. A very considerable overland traffic now exists between Tibati and Banyo. At the latter place, a large village surrounded by a wall and ditch, the expedition was obliged to bivouac without the walls, as the chief and the majority of his warriors were absent. It is a place of great commercial activity, for two great caravan tracks from the south-east and south-west unite here, and two main routes—one through Koncha to Yola, the other past Gashka to Ibi—lead to the Benue. Following the latter route, Lieutenant Morgen arrived at Ibi, where he embarked on a steamer for Lagos.

The Sanga.—On January 11th M. Fourneau left Brazzaville to explore this river, the cannon-boats, which carried his followers and baggage, being under the command of M. Gaillard. On the 3rd February the flotilla arrived at the confluence of the N'Goko, discovered in 1890 by M. Cholet. Opposite the mouth of this tributary lies an island, on which stands the village of Muiganga. On the left bank of the river M. Gaillard established a post, the position of the site being 1° 36′ N. lat., and 15° 34′ 39″ E. long. He then ascended the N'Goko to its confluence with the Bumba, in 2° 3′ N. lat. Here the river turns to the south-west, and at 1° 58′ N. lat. its bed became so rocky that it was dangerous to advance further by boat. M. Fourneau followed the left bank of the N'Goko for

a considerable distance, and then, turning more to the north-east, regained the Sanga, or Massa, as it is there called, at its junction with the Madomba. On the same day, M. Fourneau was joined by M. Gaillard, who had steamed down the N'Goko and up the Sanga. The travellers then proceeded northwards—the one by boat, the other on the left bank of the river—to the junction of the Likela, or Ekela, and the Massieba, which together form the Sanga. The steamboat *Le Ballay* was unable to advance far along these rivers, their beds being choked with banks of pebbles. The furthest points attained were 3° 42′ N. lat. on the Likela, and 3° 31′ on the Massieba. M. Fourneau continued on his way northwards for two or three weeks, until May 10, when he was attacked in the night by the natives. Having burned his baggage, he retreated to the Likele, where he seized some native boats and, still harassed by the natives, descended that river and the Sanga until he fell in with the *Ballay*.—*Bull. du Comité de l'Afrique Française*, No. 10, and *Mouvement Géogr.* No. 19.

AMERICA.

Census of Canada.—The results of this Census are published in Bulletin No. 1. While waiting for the return of the enumerators, who traversed the country and maritime districts by all known methods of locomotion, the officials of the Department of Agriculture prepared for publication the returns of the cities, towns, and villages, dividing them into the three following groups :—(*a*) Cities and towns with a population of 5000 and upwards ; (*b*) Of 3000 to 5000 ; (*c*) Of 1500 to 3000. The results of the Census and a comparison with those of 1881 are these :—

1st. The urban population of Canada is now 1,394,259—an increase of 384,146 souls, equal to an increase of 38·1 per cent.

2d. The several groups show the following increases :—

Cities and towns over	5000	inhabitants,	40·8	per cent.
Towns	„ 3000	„	44·9	„
Villages	„ 1500	„	20·3	„

3d. In 1891 there were 47 cities with a population of over 5000 as against 35 in 1881—an increase of 12 in number.

4th. In 1891 there were 45 towns with a population from 3000 to 5000—an increase of 7 over 1881.

5th. In 1891 there were 91 villages with a population from 1500 to 3000, and in 1881 these numbered 55—an increase of 36.

As regards the growth of individual towns, the tables show that Winnipeg has increased 221·1 per cent. ; New Westminster, 342·9 ; Toronto, 88·4 ; while the city of Vancouver, which did not exist in 1881, has now a population of 13,685. The present population of the three largest towns is :—Montreal, 216,650 ; Toronto, 181,220 ; and Quebec, 63,900. The population of the provinces and the increase during the past ten years are shown in the following table :—

PROVINCES.	1881.	1891.	Increase.	Percentage
Eastern—Maritime.				
Nova Scotia	440,572	450,523	9,951	2·25
New Brunswick	321,233	321,294	61	0·02
Prince Edward Island . . .	108,891	109,088	197	0·18
Totals for the group .	870,696	880,905	10,209	1·17

PROVINCES.	1881.	1891.	Increase.	Percentage.
St. Lawrence River.				
Quebec	1,359,027	1,488,586	129,559	9·53
Ontario	1,926,922	2,112,989	186,067	9·65
Totals for the group	3,285,949	3,601,575	315,626	9·60
Western.				
Manitoba	62,260	154,442	92,182	148·06
Assiniboia, Alberta, Saskatchewan	25,515	67,554	42,039	164·76
British Columbia	49,459	92,767	43,308	87·56
Unorganised	30,931	32,168	1,237	4·00
Totals for the group	168,165	346,931	178,766	106·30
TOTAL POPULATION	4,324,810	4,829,411	504,601	11·66

The Callao Painter.—The *Pintor* or *Aguaje* is a singular phenomenon observed in the Bay of Callao during the summer months, from December to April. It consists of emanations of sulphuretted hydrogen gas, accompanied by changes in the colour of the sea-water. The name "Painter" was given it because it gives white paint a blackish tinge. Its occurrence is not confined to Callao, but is observed at various points along the coast from Payta (S. lat. 5° 5′ 30″) to Pisco (S. lat. 13° 42′ 42″) and at Pacasmayo (S. lat. 7° 24′ 30″). The gas proceeds from the black mud which covers the bottom of the bay, and the reddish discoloration of the water is due to the presence of *Infusoria* brought in from the open sea. It is not, however, definitely decided why the phenomenon occurs only in the summer and at certain points of the coast. According to Raimondi, the waters of the Rimac are prevented from escaping from the Bay of Callao by the Humboldt current, which flows past the entrance, and, with the solid matter held in suspension, are exposed to the full force of a tropical sun. Where there is no river, or no current running along the coast, the "Painter" is not observed.—*Bull. of American Geogr. Soc.* vol. xxiii, No. 3.

The Volcano Ollagua in Chili.—Herr Hans Berger has described this mountain, which he ascended during the construction of a railway to Huanchaca in Bolivia, in *Petermann's Mitt.* Bd. xxxvii. No. 10. It lies in 21° 20′ S. lat. and 68° 10′ W. long., and is one of the determining points of the new boundary between Chili and Bolivia. Its height, ascertained by a trustworthy theodolite, is 19,200 feet, and the crater lies 1160 feet below the highest point. The mountain rises suddenly from the surrounding pampas, an isolated mass without any large spurs. The pampas lie at an altitude of 12,140 feet above the sea-level, so that the relative height of the mountain is about 7060 feet. Formerly there were other craters besides the one now active. Of these the most important is the so-called Porunna, a pyramidal summit lying six miles to the west of the active crater and rising 1150 feet above the plain. It rests on a base 3900 feet in diameter, and its upper surface, a basin 65 feet deep, measures about 2600 feet across. Though standing in the midst of barren country, the slopes of Ollagua are covered with grass as high

as a man, and a few stunted firs rise to double that height. Several kinds of cactus, common on the Bolivian plateau, also occur. The fauna consists only of a few mice, viscachas," beetles, and other insects. At a height of 1700 feet Herr Berger found ice and snow, but in no great quantities owing to the small rainfall of this region. The crater does not consist of the usual funnel, but of a number of small clefts in the steep rocky ground. Sulphur, both in vapour and in a liquid form, is emitted, but of lava Herr Berger could find no trace.

Paraguay.—The *Mitt. des K. K. Geogr. Gesell. in Wien*, Bd. xxxiv. Nos. 9 and 19, contains an account of this country by Lieutenant W. Kreuth. The republic lies between the parallels of 27° 30′ and 21° S. lat., and between the meridians of 55° and 61° W. long. The northern portion, between 20° and 21° S. lat., consisting of the most northern part of the Chaco, is still a subject of dispute with Bolivia. The area of this is about 61,700 square miles, and of the remainder of the republic 56,700 square miles, the whole being rather greater in extent than Austria. The eastern part consists of an undulating plain, intersected from north to south by a central chain, in general not exceeding 1000 feet in height, but culminating here and there in summits 1600 feet high. From this central chain several ranges of small hills run towards the east and west. Round broad ridges and summits, gentle sloping hollows, and flat saddles are generally met with, and the Cerro de las Naranjas in the Cordillera d'Assuncion is the only hill which presents a rocky surface. Two-thirds of the whole country is covered with forest. The Paraguay River, on which the chief settlements stand, and which is of the greatest importance as a commercial highway, rises in Matto Grosso in lat. 14° 15″ S. and long. 56° 9′ 51″ W. It flows out of a small pool near As sete Lagõas at an altitude of 1000 feet above the sea level, and during a course of about 1050 miles falls only 750 feet. Of the tributaries lying in Paraguayan territory, the Jejuy, near the mouth of which stands the town of San Pedro, and the Ipané, which joins the main stream below Concepcion, are navigable. The capital, Assuncion (population 20,000), is connected with Villa Rica by a railway 80 miles long; thrice a week a steamboat runs to Buenos Ayres, and once a week boats run to Concepcion and to Ituzaingó on the Paraná. Once a month a Brazilian steamer calls on its way to Corumba and Cuyabá. The population of the Republic was, in 1870, barely 300,000, women largely preponderating. The native Paraguayans are small, weakly men, very lazy and listless as a rule, though brave and energetic when once roused. Most of them can speak Spanish, but among themselves they converse in their native tongue, Quarani.

About 50,000 tons of goods are exported yearly, the chief articles of export being *maté*, oranges, timber, and tobacco. About 750,000 cattle are kept, and the immigrants cultivate bananas, maize, manioc, sugar-cane, cotton, etc. S. Bernardino is the most flourishing colony; it is peopled by Brazilians and Prussians, who together number about 500. The climate is healthy, the range of temperature being small.

AUSTRALASIA.

Lord Kintore's Overland Journey.—The Northern Territory of South Australia extends northwards to the 26th parallel of S. lat., and contains an area of about 523,620 square miles. This vast country is remarkably rich in minerals—gold, silver, tin, copper, and lead. The peninsula of Arnhem Land will doubtless become one of the great mining centres of Australia. Equally favourable are the agricultural capabilities of the territory. Nearly all kinds of tropical fruits and vegetables thrive well: successful trials have been made in the cultivation of arrowroot, cotton, and maize, and there is abundant provender for cattle. Hitherto, however,

the development of the resources of the country, both mineral and vegetable, has made but little progress, owing to the scarcity of population and the absence of sufficient means of transit. Of the railway by which it was intended to connect Port Darwin with Adelaide only 850 miles have been constructed. From Adelaide a line 700 miles in length extends northwards to Oonadatta, and another section runs from Port Darwin to Pine Creek, a distance of 150 miles, leaving an interval of 1200 miles. There are few men living who have crossed the Australian continent from north to south, and no Governor of South Australia had ever visited the Northern Territory until last spring, when Lord Kintore set out to ascertain by personal observation and inquiry the hindrances to the development of the country and the measures necessary for their removal. Landing at Port Darwin on March 31, he reached Oonadatta on May 20, having traversed the 1200 miles between the railway termini in thirty-seven days. A few days after his return the Governor furnished his Ministers with a memorandum, in which his impressions and conclusions were summarised. He considers that the cultivation of tropical plants must be confined to the river valleys. On the Adelaide River are thousands of acres admirably adapted for this purpose, but much of the *Hinterland*, stretching in the direction of the Daly, is almost useless for agriculture or grazing. On the other hand, it abounds in mineral wealth, which has hitherto received little attention, though its existence has been well known for some time. This neglect is, in Lord Kintore's opinion, due to the fact that European labour is too expensive to be profitable, especially as white men cannot do a fair day's work in the hot climate of the Northern Territory. Agriculture also depends for success on an adequate supply of cheap labour. To meet this demand Lord Kintore looks to the Indian coolie or other Asiatic labour, and, while approving of the regulations in force for the exclusion of Chinese from the more temperate parts of the continent, considers this people almost necessary for the prosperity of its tropical countries. The grazing industry suffers from scarcity of water and the want of accessible markets. The news that a contract has been made for the building of a cattle steamboat has caused great satisfaction in Palmerston. The trans-continental railway is of the greatest importance, and the Governor suggests that in this case promoters should be induced to complete the work by an offer of grants of land. He also suggests that the dividing-line between S. Australia and its Northern Territory should be moved to the 20th or 21st parallel, whereby the former would gain a considerable extent of valuable land without detriment to the Northern Territory, the resources of which ought to be employed in the development of its more accessible portions.—*The Times*, Sept. 5.

Census of the Australasian Colonies.—The following figures relating to the population were obtained by the Census of 1891 :—

	Males.	Females.	Totals.
Victoria, . . .	599,172	541,233	1,140,405
New South Wales, . .	616,008	518,199	1,134,207
Queensland, . . .	223,781	170,157	393,938
South Australia (including the Northern Territory), .	166,374	153,632	320,006
West Australia, . .	29,878	19,957	49,835
	1,635,213	1,403,178	3,038,391
Tasmania, . . .	77,560	69,107	146,667
New Zealand, . .	333,175	293,655	626,830
Grand Totals, . .	2,045,948	1,765,940	3,811,880

The Northern Territory of South Australia contains 4958 inhabitants, of whom only 1165 are Europeans. The natives of Australia, their number being undetermined, are omitted, except those in the service of Europeans in Victoria and New South Wales. The number of Maoris in New Zealand is estimated at 41,523. The increase in the seven colonies during the past ten years has been 1,059,706, or 38·54 per cent., and of the five Australian colonies 891,907, or 41·86 per cent. The highest rate of increase was in Queensland, 80·3 per cent., and the lowest in South Australia, 13·95 per cent. The ratio of males to females is 100 : 86·31.—*Deutsche Rundschau*, Jahrg. xiv. Heft 2.

The *Tour du Monde, Nouv. Géogr.*, p. 328, gives the populations of the capitals, as follows :—Melbourne, 489,185 ; Sydney, 386,400 ; Adelaide, 133,019 ; Brisbane, 55,959 ; Perth, 9615 ; and Hobart, 24,884. Since 1881 Melbourne has received an increase of 206,238 inhabitants ; Sydney, 162,189 ; Adelaide, 29,007 ; Brisbane, 24,850 ; and Perth, 3793. Hobart, on the other hand, has diminished by 2364.

The Trade of Fiji.—The imports and exports in 1890 were of the value of £571,290, or £102,138 in excess of the amount in 1887. The exports are to the imports in the ratio of 63·81 : 36·19. Among the former sugar and molasses show a steady increase, while maize has fallen off, owing to increased local consumption. There is a marked rise in the value of manures, building materials, and machinery imported.—*The Colonies and India*, August 1, 1891.

GENERAL.

Arctic Winds and Polar Expeditions.—Dr. A. Supan discusses, in *Petermann's Mitteilungen*, Bd. xxxvii., No. 8, the movements of the air in the Arctic regions. His results are obtained from a study of Dr. Buchan's charts annexed to the *Challenger* report. Dr. Supan divides the year into three parts : the first extends from November to May ; the second from June to August ; and the third consists only of the months of September and October. During the first of these a belt of high pressure runs from the Asiatic to the American coast and divides the Arctic basin into two parts. On the east the air flows to the Pacific, and on the west to the Atlantic, low-pressure centre. The middle line of this ridge Dr. Supan calls the Arctic *wind-parting* (*Windscheide*). But during the period in question, this wind-parting undergoes great changes in position, approaching the Bering Straits during the months of November and December, and in February beginning a rapid retrogression, which carries it past the Pole and almost to the Atlantic threshold of the Arctic regions. In summer the belt of high pressure disappears, and instead a feebly-developed anticyclone is formed somewhere in the neighbourhood of the Pole, whence winds flow outwards towards the continental borders. These winds must, in such high latitudes, be diverted considerably to the east by the rotation of the earth. Lastly, during September and October, a deep barometric depression passes from the Atlantic Ocean along the northern coast of the Old World towards the New Siberia Islands. On the northern edge of this depression easterly winds must prevail. The drift of the *Jeannette*, as recorded in De Long's log-book, is a proof of the correctness of the preceding conclusions, for it must be remembered that the ocean currents are mainly directed by the wind. The vessel advanced or receded, along with the ice in which it was imprisoned, in general, at those times when, according to the foregoing theory, the wind-parting would lie to the east or west of it respectively. Hence it is evident that vessels entering the Arctic Ocean from the Atlantic have to struggle, for the greater part of the year, against the stream, while those that enter from Bering Straits swim

with it. Dr. Supan considers, in the next place, the time that will probably be required by Dr. Nansen's expedition to perform its journey across the Pole. The ice-block which transported the articles belonging to the *Jeannette* expedition (*S.G.M.*, vol. vi., p. 35) covered a distance of 3300 miles in 1100 days, or about three miles a day. This is a rate never surpassed by the *Jeannette*, except in her last forward drift, and, therefore, it may be assumed that the ice-block did not retrograde so rapidly and for so long a time as the ship. During the changes of the position of the wind-parting it may have always remained in the region of the Atlantic current. It may also be inferred from the drift of the *Jeannette* that the non-periodic displacements of the wind-parting are most marked in the neighbourhood of Bering Straits, so that Dr. Nansen is likely to make rapid progress after passing the New Siberia Islands. Five years, then, may be considered as more than ample allowance for the duration of the voyage.

While Dr. Nansen's route is undoubtedly the best for vessels, the Pole may be reached with sledges by other routes. M. H. Ekroll, a Norwegian, has designed sledges which may be combined to form a boat. His expedition is to consist of six members, and the sledges are to be drawn by a large number of dogs, so that the speed may be increased and the supply of provisions requisite reduced. Being able to travel over sea or ice, the expedition will, to a certain extent, be independent of wind and weather. From the eastern island of Spitzbergen, somewhere about Cape Mohn, to which place the expedition will be conveyed by ship in June 1893, Herr Ekroll will make for Petermannsland, in order to avoid the ice drifting to the west and north-west. To the north of Petermannsland he hopes to find more compact ice, and to be able to travel direct to the Pole. Should mishap occur, or the movement of the ice be too rapid, he can retreat on Spitzbergen, where a dépôt will be formed, but, under favourable circumstances, he will return from his furthest point to the east or west coast of Greenland, where also dépôts will be formed. The success of the expedition depends in great measure on the condition of the ice and the progress that can be made against the wind, for in all probability the wind will be adverse. Dr. Supan estimates the distance from Cape Mohn to Petermannsland at about 435 miles, from Petermannsland to the North Pole at about 590, and thence to Fort Conger at 515. This distance of 1540 miles would be traversed at the rate assumed by Herr Ekroll, 11 kilomètres or about 6·8 miles per day, in 226 days. Herr Ekroll has yet to find funds for his expedition. His country cannot be expected to contribute more to such undertakings, and he will, therefore, have to look for aid elsewhere.

Soundings in the Mediterranean and in the Indian Ocean.—On the 28th of July a sounding of 2408 fathoms was taken by the Austrian expedition on board the *Pola*, between Malta and Kandia, in lat. 35° 44′ 20″ N. and long. 21° 44′ 50″ E., and 20 miles to the south-east of this spot another sounding of 2230 fathoms. These depths exceed even those of the *Abisso Magnaghi* (*vide* p. 494).

In the Indian Ocean, in lat. 11° 22′ S. and long. 116° 50′ E., the *Recorder* has found a depth of 3393 fathoms, greater by more than 100 fathoms than any sounding hitherto taken in this ocean.—*Petermann's Mitt.* Bd. xxxvii. No. 10.

The Railways of the World.—The *Deutsche Rundschau*, Jahrg. xiv. Heft 1, gives the following figures. In Europe the total length of railways open for traffic in 1889 was 136,870 miles ; in Asia, 19,278 ; in Africa, 5366 ; in America, 197,558 ; and in Australia, 11,136 : total, 370,210. If these figures be compared with those for 1885 and 1886 (*S.G.M.* vol. v. p. 158), it will be seen that a large increase has taken place. The length of new railways is greatest in America, Europe comes next, but if the percentage is taken, this continent occupies the last place in the

list. Asia has few railways compared to its size, but the percentage of lines made since 1885 is very high, namely, over 39 per cent.

The Price of Ivory.—The firm of Meyer, in Hamburg, has published a pamphlet wherein are shown the fluctuations in the price of ivory during the past fifty years. Abstracts from this pamphlet are published in the *Mouvement Géogr.* No. 21, and the *Deutsche Kolonialzeitung*, No. 10, and in the latter the fluctuations are represented by a diagram. In 1840, the average wholesale price was 10 marks a kilogramme, or barely 4s. 6½d. per lb. Since then it has gradually risen, until this year it has reached 12s. 3½d. per lb. From 1885 to 1890 the price was comparatively low, European activity being very great in Africa during those years, but in 1890 the blockade of the East Coast caused the price to rise to 12s. 11d. The total quantity supplied during the years 1879-83 was 853 tons, Africa yielding all but 20 tons. Of this, Britain took no less than 286 tons, and Germany and India were second and third in the list of customers.

MISCELLANEOUS.

Two new branches have been discovered in the famous **Cave at Adelsberg**, Carniola, in length almost double the part already known.—*Revue Française et Exploration*, September 1st, 1891.

The total number of **Artesian Wells** that have been bored in **Algeria**, in the departments of Algiers, Oran, and Constantine, is 13,135. Through their instrumentality 12,000,000 acres have been reclaimed.—*Science*, August 7th.

Since **Zanzibar** became a British Protectorate, its **Shipping Trade** has nearly doubled, the net tonnage entered during the past six months being 130,000 tons, against 72,000 for the previous half-year.—*The Colonies and India*, October 31st, 1891.

Telegrams from Mombaza state that the *Kenia*, a **Steamboat** of the British East Africa Company, arrived at Baras (Baza ?) on June 29th, having, therefore, navigated the **Tana** to a distance of 300 miles from its mouth.—*Boll. della Soc. Geogr. Italiana*, September 1891.

Mr. Joseph Thomson has returned home after a successful journey to Lake Bangweolo, in the course of which he has been able to gather trustworthy information on that lake, and to clear up the discrepancies which exist between Livingstone's and Giraud's delineations of it.

In Josephine County, Oregon, an enormous **Stalactitic Cave** has been discovered, not inferior in extent, probably, to the Mammoth Cave in Kentucky. It is situated at a distance of twelve miles from the Californian boundary and forty miles from the coast.—*Deutsche Rundschau*, Jahrg. xiv. Heft 1.

A regular service of **Steamboats** has been established on the **Orinoco** and its affluents. One of these boats will ascend the Meta to Cabuyaro, a day's march from Bogotá. Colombia possesses an extremely fertile soil, vast forests of valuable trees, and considerable mineral wealth. By this new service the distance traversed in journeying from Bogotá to Europe will be shortened by 370 miles.—*Revue Française et Exploration*, September 1st, 1891.

An unsuccessful attempt has been made by the steam-launch *Argus* to shoot the **Rapids of Khong** by the passage discovered by MM. Pelletier and Mougeot (*S.G.M.* vol. vi. p. 424). A commission sent to study the question has decided that the rapids are impassable, and recommends that a service of boats should be

established on the upper course of the river Mékong. The boats must be taken to pieces at Khong, and carried past the rapids by a Decauville railway, which may afterwards be used for the transport of merchandise.—*Le Tour du Monde, Nouvelles Géogr.*, p. 342.

Exploration in Central Asia is still prosecuted vigorously. The departure of Captain Bartchevsky for the Pamir has been already announced. M. Katanof is engaged in the exploration of the Thian Shan. His intention was to proceed to Khami through Umrutsi and Barkul, to pass the autumn at Turfan and the winter in Kuldja. General Tillo will examine the depression in the Turfan oasis, discovered by the brothers Grum Grzhimailo. The Imperial Academy of St. Petersburg is organising an expedition for the scientific exploration of Siberia. Count Eugene Zichy is preparing an expedition to the Altai Mountains. Prince Galitzin has arrived at Karghalik, and Prince Constantine Viazemsky writes from Khiakta that he is setting out for Pekin, whence he will proceed to Indo-China.

NEW BOOKS.

Crozet's Voyage to Tasmania, New Zealand, the Ladrone Islands, and the Philippines, in the Years 1771-1772. Translated by H. Ling Roth. Illustrated. London: Truslove and Shirley, 1891. Pp. xxiii. + 148. (500 copies printed.)

It was only fitting that the translation and editing of Crozet's voyage should be undertaken by the accomplished author of *The Aborigines of Tasmania*. The expedition in question, commanded, till his death in New Zealand, by Marion du Fresne, is an important link in that great century of exploration in which French navigators had so distinguished a part, and it is the irony of fate that the names of these two accomplished sailors, Marion and Crozet, after having been the first, practically, to visit and describe New Zealand, and who, in fact, annexed it to the French crown, should now be only represented on the map of the World by two barren and almost inaccessible groups of rocks in the Southern Ocean. (The name of "Marion," by the way, occurs some thirty times as a town-name in the United States, but probably with no reference to the explorer.)

After sighting and taking the position of the aforesaid groups, the explorer proceeded to Tasmania, then supposed (for Bass had not then discovered the strait which bears his name) to form part of the Australian continent. Here their intercourse with the natives was soon closed by a fight, owing to their misunderstanding of a curious and certainly obscure native sign of amity. Their stay in New Zealand was interrupted, as is well known, after several weeks of friendly intercourse, by the massacre of a large party of the French, including the commander. It is difficult now to say to what this action on the part of the Maoris was due. It may have been simple caprice or treachery of these children of Nature, but it was more probably due to the violation by the French of some specially sacred *tabu*, unintentional, for this institution was not then understood; or it may have been revenge for the harsh conduct of Surville's people two years previously. The event naturally gives a dark tinge to all Crozet's observations on the character of the people—though, indeed, he has not much pity to spare for any "savages," even under the Spanish mercies, lay and clerical, of 200 years ago. The Spanish governor at Guam in Crozet's time, M. Tobias, seems, however, to have been a man of much humanity and enlightenment. Crozet now took command of Marion's ship, the *Mascarin*. He hardly alludes to the captain, Duclesmeur, of the companion ship, the *Castries*,

though that officer now became the commander of the expedition. On leaving New Zealand his wish was to visit the Amsterdam and Rotterdam of Tasman (the islands Tongatabu and Namuka of the Tongan groups) but his course took him too far to the east, and he only sighted some outlying reef islands, and probably on his course northwards the island of Niuafoou. Sailing thence still northward, he seems to have just missed all the numberless islands of the Ellice, Gilbert, and Marshall groups, though constantly observing traces of the neighbourhood of land, and then, turning westwards, made the island of Guam in the Ladrones ; from thence he proceeded to the Philippines. He was hospitably received in both these groups, and it is interesting to compare his remarks on these islands with their actual condition under the Spaniards. Equally interesting are all his details about the people and the natural resources of New Zealand. Though not a man of science, he is a close and accurate observer, with a keen perception of the beauties of Nature, and his descriptions are singularly clear in their details.

Several of his statements as to the flora and fauna might with advantage have been elucidated by editorial notes—*e.g.*, the "potatoes" he speaks of were probably not potatoes at all, but the *Batatas* (*convolvulus*) *edulis*. It is hardly possible that potatoes could have existed in New Zealand before Cook's time. Cook, indeed, mentions having gathered potatoes on his second voyage, but, we take it, they were the result of what he himself must have planted on his first visit. It would have been interesting also to know what exactly were the "Aloes pite" and "a very small flax" ; both were cultivated, so the latter could not have been the *Phormium tenax* ; and other names of plants and of birds should have been identified.

There is a curious discrepancy between two descriptions quoted, both careful and elaborate, of the Ladrone outrigger, the one by Crozet and the other by Captain Anson forty years earlier. Crozet states that the outrigger and flat side (the other only being convex) is always kept to leeward, while Anson explains that they always sail with the outrigger to windward. Crozet is quoted as saying, "These boats have no bridge" : this should surely be "no *deck*" (*pont*). There are a good many misprints, and some wrong numbering of the plates, which, besides, are not placed opposite the passages to which they refer.

Hugo Zöller: Deutsch-Neuguinea und meine Ersteigung des Finisterre-Gebirges. Eine Schilderung des ersten erfolgreichen Vordringens zu den Hochgebirgen Inner-Neuguineas, der Natur des Landes, der Sitten der Eingeborenen und des Gegenwärtigen Standes der Deutschen Kolonisationsfähigkeit in Kaiser-Wilhelms-Land, Bismarck- und Salomo-Archipel, nebst einem Wortverzeichnis von 46 Papua-Sprachen, etc. Stuttgart, Berlin, Leipzig : Union Deutsche Verlagsgesellschaft. Pp. xxxii. + 546.

To the first and most prominent item of this comprehensive title-page, viz., the expedition to the Finisterre Mountains, reference has already been twice made in our *Magazine* (see vol. v. p. 505 ; and vii. p. 40).

The details of the journey now given, besides that the narrative is agreeably written, are valuable as pointing out the special requirements and difficulties of New Guinean travel ; the latter, to say the truth, do not seem particularly formidable—it is necessary to carry provisions ; but the party suffered very little from fever, the natives, if not friendly, were timid, while the difficulty of porterage seems now to have been surmounted—imported labourers from the "Bismarck" Archipelago, and even the New Guinea coast natives, acting well and willingly as carriers. If the leaders of the expedition wore out three pairs of boots each in a month, we should be inclined to blame rather the bootmaker than the roads. They

had time and all the resources of the administration at their disposal. The exploit, therefore, is hardly comparable with Sir W. Macgregor's ascent of Mount Owen Stanley, to which the writer makes only a short and half-contemptuous reference as having reached that summit after "several dozens (!) of failures." We may here, by the way, express our regret at the uniformly hostile and sneering tone which the author, being in the service of the *Kölnische Zeitung*, adopts towards everything British, though we cannot deny that it has afforded us some amusement. The moral character of British sailors, officials, and colonists is altogether on a lower level than that of the German. Our Australian colonists, especially, who are combined in an unscrupulous league against German interests, will learn with amused surprise that they are a feckless folk, and, compared with German colonists, singularly unsuccessful! The writer describes in glowing terms the look of prosperity, order, and comfort which greets the new-comer in the German territory, and which, no doubt, does great credit to their energy and powers of organisation. We should like, however, to know more as to the process by which the lands in possession of the white men (surrounded by barbed-wire fences) have been acquired. There is, also, we are told, abundance of labour at the disposal of settlers. Most of this comes from New Britain and the adjacent German islands, including the Solomons. It would be interesting to know how this immigration has become so willing and enthusiastic as the writer describes it, and freed from the grave objections by which the labour traffic has hitherto been disgraced. The writer places in forcible contrast the advanced organisation of the German colony and the condition of British New Guinea, where, he says, the rudiments of administrative and economic construction hardly exist. Those who have followed the remarkable results achieved with very slender resources by Sir William Macgregor will know what value to attach to Herr Zöller's comparison. But, in short, we must remember that the German writer throughout uses the word colony in a different sense from what we do. For him it is the "plantation" of 200 years ago, to be *exploité* primarily, if not solely, for the benefit of the white man. He advocates, indeed—ostensibly in the interest of the natives—a system of forced labour similar to that (now greatly modified) of the Dutch in Java. It is not our method, but it has produced great results, and in the abstract we are far from condemning it, and should watch the process in the German territories with great interest. But the *Kolonialmenschen* are (not unnaturally) in a great hurry for results. We should like to see a little more patience, and some attempt to understand the *Lebensansichtspunkte* of these weaker races, and certainly we shall feel a good deal of pity for the *corpus vile* during the course of experiments which are likely to be made upon it. Meanwhile, the troubles into which the German New Guinea Company has fallen since the author wrote are a sufficient commentary on his observations.

Herr Zöller draws some interesting comparisons between the New Guinea natives and those of West Africa, where he spent some time. He thinks the former equal in natural capacity to the African, though his faculties are less developed,—more trustworthy, but less energetic, less ambitious or desirous to "improve his position" by trade, etc. In this respect, and generally in force of character, the islanders of the Bismarck Archipelago and the Solomons have the advantage, he considers, over those of the mainland. Their institutions, political and social, their knowledge of art, and their use of money all prove a more advanced condition; and, if the Solomon islanders especially are a ruder and fiercer people, they afford better material to work on. These conclusions are drawn from somewhat slender premises. The superiority of the island populations over those of the New Guinea mainland has been observed before, *e.g.*, in the Dutch territory, and may be referred perhaps to a greater abundance of animal food (fish, etc.), or to a larger infusion of Malay and

other foreign blood. Herr Zöller's vocabularies—collected, he tells us, with great care—are very welcome, and his remarks on the subject of the languages—the results of personal observation—are interesting. Thus he reduces to their elements the so-called duals and plurals; of the exclusive and inclusive plural forms he says he has found no instance in German New Guinea. His experience quite corroborates the verdict of Dr. Codrington and others as to the substantial unity of origin of these languages. Although so-called different languages are found at distances of three or four miles, there is always considerable resemblance among those nearest each other, and these groups again have affinities evident yet less close, with others further off. Herr Zöller combats Maclay's assertion of the smallness of the vocabularies, showing that the apparent poverty is balanced by the very large number of concrete terms. The great facility with which a native acquires several neighbouring languages is a proof of their similarity. The wide-spread identity of customs says much more for the identity of the race than the diversity of dialects does against it. Speaking generally, we may take the great multiplication of dialects as a proof of extreme isolation, and thus of a lower status of culture. In the Solomon Islands the wide area (on Buka and the northern portion of Bougainville) occupied by a single language coincides with a relatively higher condition of the people. The etymological history of this name, Buka, is curious. The island was discovered by Carteret in 1767, and visited in 1768 by Bougainville, and in 1792 by D'Entrecasteaux. None of them report any native name, and in fact no general name for the whole island exists among the natives. They say they only know the name "Buka" as the white man's name for the island; but the word *buka*, which was shouted by the natives to their first visitors, and adopted as the name of the island, simply means "Be off!" Another instance of unscientific etymology he mentions is connected with the word "lima," which in so many of the Oceanic languages means the hand (and thence five). In one of the New Guinea dialects it is *liman*, which an ingenious official explained as derived from the French—*la main!* What chiefly vexes our author's soul, from a linguistic point of view, is the prevalence in the islands of Pidgin English, and the necessity for using it, which is not, he says, consistent with German self-respect; and he proposes the somewhat summary and compulsory adoption of a native idiom in its place. He describes the Admiralty Islanders as possessed with a "strange inclination to give things away"; food, ornaments, weapons, are given without waiting for an expectation of payment. They are no doubt as ready to ask as to give, but such consistent communists have much to unlearn from the nineteenth-century Christian. Of other habits and customs Herr Zöller has much to tell, which, though by no means new to those who have studied the subject, is interesting as confirming previous impressions, and showing the fundamental similarity, with occasional diversity, of Papuan character and customs, in widely separated parts of the great island between which no communication is known to exist.—C. T.

Die Klimatologie der Tropen. (Erster Bericht.) Nach den Ergebnissen des Fragebogenmaterials im Auftrage der Deutschen Kolonialgesellschaft bearbeitet von Dr. O. Schellong. Berlin: Carl Heymann's Verlag, 1891. Pp. 48.

At the Congress of German Naturalists and Physicians, held at Heidelberg in 1880, it was decided to take steps to collect and publish information concerning the medical geography and the climatology of the Tropics; and the German Colonial Society was requested to arrange with specialists to prepare a scheme of questions to be sent to physicians and others resident in the Tropics. This pamphlet is the first result of this praiseworthy endeavour. It has been drawn up by Dr. O. Schellong of Königsberg, who has had the advantage of having been resident in the

Tropics himself, and it was presented to the Congress at Halle in 1891. As might have been expected, the replies which have been received to the questions sent out in hundreds have been few. Indeed, only thirty-five reports are quoted by the editor. Their geographical distribution is unequal, there being only two from the South Seas and two from Australia. From the East and West Indies there are respectively six and five reports, the remainder being from Africa. Concerning the subject-matter, we can say that the editor has done his work well, considering the limited material at his disposal; and the report contains a considerable amount of interesting information. But, at the same time, it is impossible to give anything like an accurate or permanently valuable description of such a wide subject in forty-six pages. The great advantage, however, of this publication is to stimulate inquiry, and we hope that the ensuing reports will be based upon greatly-extended information.

Geodosy. By J. Howard Gore. (Heinemann's Scientific Handbooks.) London: William Heinemann, 1891. Pp. 218. *Price* 5*s.*

This is a brief sketch of the progress of the science from the earliest times to the present day. The author passes quickly over the early notions of the figure of the earth and the crude attempts at arc-measurement by Eratosthenes, Kaliph Almamon, and others down to Fernel, and proceeds to a criticism of calculations based on the system of triangulation first introduced by Willebrord Snellius in 1615. Very interesting are the descriptions of Picard's measurement of a degree of latitude, which enabled Newton to complete his theory of universal gravitation, and of the measurements of arcs in Lapland by Maupertuis and in Peru by Bouger and Godin, which proved that the figure of the Earth is an oblate spheroid, and settled the dispute between the followers of Newton and Huyghens on the one side and those of Cassini on the other. The latter chapters are devoted to the work done in the different countries of Europe, in India, and in the United States. Mr. Gore claims to possess reports not to be found in any library, and promises a more exhaustive work at some future date. The present sketch is clearly written, and sufficiently detailed for the majority of readers. The measurement of the Paris base and its relations to the surveys of other countries are not referred to, probably because the result was not published in time. Some slight allusion might however, have been made to later French work, particularly in Algiers. A longer discussion of the figure of the Earth would have been acceptable. A table of the ellipticity, as calculated by well-known authorities, followed by a few short remarks, is all that is given on the subject. The latest calculation is by Professor Harkness, of the United States Navy, which has been completed in the present year. He gives the ellipticity as 1 : 300·2, and the length of a quadrant in mètres as 10,001,816. Though the volume is small, it is provided with an index, which enables it to be used as a work of reference.

English Men of Action: Rodney. By David Hannay. London: Macmillan & Co., 1891. Pp. 222. *Price* 2*s.* 6*d.*

Had the author exercised more restraint and revised more carefully, this work might have been a masterpiece. But one is amazed to find a European war spoken of—not once only—as the "War of Jenkins' ear or of the Austrian Succession;" the date of Rodney's great victory of April 12th, 1782, given by sheer neglect (for this subsequent references, all of them accurate, clearly show) as August 12th (page 4); a too colloquial style becoming on occasions more forcible than correct; and occasionally, too, (*e.g.* on page 25, l. 6, *he* for "him"; p. 185, l. 29, "*double*

sure") expressions hardly grammatical: shortcomings, these latter, the more regrettable, since the style, vigorous and racy, is usually so well suited to the subject. Again, exaggerated depreciations of men like the Duke of Newcastle—the victim as much as the exponent of a corrupt official system—are out of place in a work of this kind: Newcastle, if he did nothing else worth doing, at least did good service (though by means we of to-day cannot approve) by undertaking the management of parliamentary influence, on which Pitt was greatly dependent during the Seven Years' War, and in the art of which the Great Commoner was notoriously deficient; moreover, Rodney owed something to his Grace, so why should Mr. Hannay complain? In short, there is a deal of mischievous writing for effect in this book.

These strictures passed, however, one has little but praise. The book is more than a life of Rodney, varied as that life was. Mr. Hannay reveals to us the connection, often disastrous, between Crown and placemen, and the authorities at home and their agents on the seas, as well as the relations between superiors and subordinates in the naval service. He writes with ease of the naval tactics of the day, of the pressgang and many evils, both necessary and superfluous. In May 1759 Rodney became rear-admiral. He had already seen considerable active service, especially off Cape Finisterre in 1747, and ten years later under Hawke and Boscawen. Between 1761 and 1763 he was in the West Indies. For sixteen years after 1763 he was not called upon to hoist his flag. That his name lives is due to his capture of the Spanish merchantmen and defeat of the Spanish fleet in January 1780, his seizure of the "free port" of St. Eustatius, and, in particular, to his victory over Grasse in the battle variously called "of April 12th," "of the Saints," or "off Dominica." This last fight witnessed on Rodney's part (though by an accident—the shifting of the wind—and probably on the suggestion of Sir Charles Douglas, captain of the fleet) the first use of tactics which Nelson was afterwards to employ with so marked success at Trafalgar—the "breaking of the line" of the enemy. A conspicuous merit of Mr. Hannay's book is the attention he gives to the conditions imposed, in sea-fights, by the action of the wind and the current, and by the "lie" of the land; these, as Mr. Hannay remarks, and as many writers of histories have yet to learn, are to a Rodney and a Nelson what the hill, the river, and the wood are to a Wellington or a Napoleon.

Certain blemishes apart, then, this book should be welcomed.

The Land of the Lion and the Sun, or Modern Persia. Being Experiences of Life in Persia from 1866 *to* 1881. By C. J. Wills, M.D. (The Minerva Library of Famous Books.) London: Ward, Lock, and Co., 1891. Pp. xviii+446. *Price* 2*s.*

Dr. Wills' position and profession gave him, during his stay in Persia, opportunities of studying the inner life of the people which do not fall to the lot of the ordinary traveller, or even to the general run of foreign residents in that country. But besides these advantages he has a faculty for close observation and a keen sense of the humorous, not to say of the ludicrous, which makes his book not only a valuable treatise upon a most interesting and little-known country, but a work very pleasant to read for relaxation and amusement. It is full of adventures of the kind which accompany Persian travel, of curious character sketches, and of out-of-the-way experiences, making, altogether, an excellent and readable record. The illustrations, copied from native originals, are, generally, exceedingly quaint, and enhance the charm of this new edition. It is a valuable addition to a valuable series.

A Guide-Book to Books. Edited by E. B. Sargant and Bernhard Whishaw. London: Henry Frowde, 1891. Pp. xvi. + 344. *Price* 3*s.* 6*d.*

The names of the contributors to this work are a guarantee of its excellence, and a thorough investigation of its contents has fully justified our expectations. The selections under each of the very numerous headings contain nearly all the works that have an established reputation. And not only are large and important treatises given, but text-books, grammars, etc. are included, so that the student of any science or language will find his course laid down for him, with short notes for his guidance. A few books are omitted which we should have expected to find. The popularity long enjoyed by Burton's *Anatomy of Melancholy* might have warranted its insertion; Riddle and White's *Latin Dictionary* should, we think, have been included; and De Amici's *Constantinople* and *Spain* seem to be as worthy of a place as his *Holland* and *Morocco*; Mansel's *Prolegomena Logica*, a most delightful book, which has, unfortunately, been long out of print, and now sells for double the published price, is also absent. On the other hand, a few works have probably gained a place through the reputation of their authors rather than by their intrinsic merit. Every one, however, has certain favourite books, and works best with those he is accustomed to use. We have no serious fault to find with this guidebook; it is certainly the best work of its kind that we have seen, and we can thoroughly recommend it to all students.

The editors deserve great praise for the arrangement. On this head it is sufficient to say that we have been able to find quickly any book we chose. The letterpress is clear, and a judicious use has been made of different types. The price of each book is given, and those that are out of print are so marked. The typographical errors are few and unimportant.

Landscape Geology: A plea for the study of Geology by Landscape Painters. By Hugh Miller, of H.M. Geological Survey. London and Edinburgh: Blackwood and Sons, 1891. Pp. 63. *Price* 3*s.*

In this little book, which consists of an address delivered before the Edinburgh Geological Society amplified by the addition of a preface and an appendix, Mr. Miller pleads for the study of geology by landscape painters, on the same principle as renders the study of anatomy necessary to those whose works deal principally with the human figure. Lovers of nature may, indeed, wonder why such an exhortation should be required at all, but alas, it seems to be an article of the fashionable artistic creed that the accurate treatment of natural objects other than the human body is derogatory to the dignity of art and false to its function! Yes, the artist must study in the life-school if he means to paint figures, and woe be to him if a single muscle is out of drawing; but were he, as a true son of nature, to paint his mountains, rocks, trees, and flowers lovingly and faithfully, the critics would probably be down upon him at once with such parrot-cries as "coloured photography"—"scientific diagram"—"mere transcription of nature," and so on *ad nauseam*. Mr. Miller in his preface justly contrasts the minuteness with which costumes, furniture, and *bric-à-brac* are often painted, with the paucity of landscapes which suffer from excess of detail in geological structure. Indeed, we may often hear the Art Critic, who thinks a meaningless blotch of green or of brown quite the proper thing for a tree or a rock, absolutely gloating with delight over the laboriously minute painting of the backs of a lot of old books.

Mr. Miller, referring to the feebleness of the rock painting in the Royal Scottish Academy's Exhibitions, says,—"A fact so general cannot be without some good reason, and I fear that there can be but one—want of sympathy with this part of the subject."

There are probably many people interested in art or literature who will say that, as Mr. Hugh Miller is a professional man of science, he cannot possibly know or care anything about art or have any sympathy with anything else than intellectual knowledge. However, he does good service by protesting vigorously against "the statement that science and the fine arts, or science and poetry are at opposite poles." The fact is that the real antagonism is not between science and art, but only between science and the narrow-mindedness of certain littérateurs and art-critics.

NEW MAPS.

ASIA.

OSTASIATISCHEN GEWÄSSERN, Die Meeresströmungen und Temperaturverhältnisse in den ——. Von Dr. Gerhard Schott. Tafel 1. Isothermen der Meeresfläche im Februar. Tafel 2. Isothermen der Meeresfläche im August. Tafel 3. Linien gleicher jährlicher Schwankung der Oberflächen-Temperatur des Meereswassers. Tafel 4. Jahresisothermen des Wassers der Meeresoberfläche. Nebenkarten: Der Kuro-shiwo zwischen Formosa und Japan. Februar-Zirkulation in der Formosa-Strasse. *Petermann's Geographische Mitteilungen, Jahrgang* 1891, *Tafel* 15. *Gotha: Justus Perthes.*

ASIA MINOR, Der Beg Dagh und Malatia. Aufgenommen und gezeichnet von Prof. Jos. Wünsch. Massstab, 1 : 300,000. *Mitteilungen der K. K. Geographischen Gesellschaft in Wien*, 1891, *No.* 8. *Wien: R. Lechner's K. K. Hof-Buchhandlung.*

PALESTINE, Map of ——, from the Surveys conducted for the Committee of the Palestine Exploration Fund, and other sources. Compiled by George Armstrong, and revised by Colonel Sir Charles Wilson, K.C.B., F.R.S., etc., and Major C. R. Conder, D.C.L., R.E. *Engraved, Printed, and Published for the Committee of the Palestine Exploration Fund, at Stanford's Geographical Establishment, London*, 1890. Scale $2\frac{3}{4}$ miles to 1 inch, or $\frac{1}{158,960}$. In 21 sheets, and cover.

This map is the latest, and by far the most useful, of all the maps published by the Committee of the Palestine Exploration Fund: it embodies the information contained in all their previous maps. It contains, in a reduced form, the whole of their great survey of Western Palestine, but, while that famous map, as is well known, only contains the modern Turkish names and no Biblical ones, this new map, in addition to the modern names, contains every identified site from the Old and New Testament, as well as the Apocrypha, Josephus, and the Talmud. These identified sites are made conspicuous by bright colours—the Old Testament and Apocrypha names in red, and those from the New Testament, Josephus, and the Talmud in blue, while the modern names appear in black. The map embraces the whole of Palestine on both sides of the Jordan, and extends from Baalbek in the north to Kadesh Barnea in the south. Another Bible feature is the identification of the tribal divisions, which are shown by coloured tints. The execution of the map by Mr. Stanford is all that could be desired, every feature of the country being most clearly and effectively brought out, while the printing of the hill-shading in brown allows the names to be distinctly seen and easily read.

MESOPOTAMIEN, Karte zur Veranschaulichung der Verkehrsverhältnisse, in ——. Von Dr. B. Moritz. Massstab, 1 : 3,000,000. *Mitteilungen der Geographischen Gesellschaft in Hamburg* 1890. *Heft* II. *Hamburg: L. Friedrichsen & Co.*

AFGHANISTAN, Map of ——. Scale, 1 : 1,520,640, or 24 miles to 1 inch.

Published under the direction of Colonel H. R. Thuillier, R.E., Surveyor-General of India, 1889. *Price uncoloured*, 3 *R.*; *coloured*, 3 *R.* 8 *A.*

This four-sheet Map of Afghanistan, and Professor Kiepert's Map of Western Asia Minor, are the most important publications in Asiatic cartography of the present year. The map was completed in 1889, but, for political reasons, the publication was delayed by the Government of India for two years. The N.W., N.E., and S.W. sections have been compiled by Major St. G. Gore, while the S.-E. sheet has been executed by Major C. Strachan. The data that had to be consulted were numerous, such as the surveys and reconnaissances of the Afghan Boundary Commission in the years 1884-86, which threw a new light on the topography of the country from Herat towards the Amu-Daria. The environs of Herat, Maimana, and Sar-i-pul, as well as the course of the Upper Murghab, Hari-Rud, Aster-ab, Balk-ab and Kunduz, may now almost be considered as topographically mapped. The whole range of the Hindu-Kush has assumed quite a different appearance as regards its valleys, peaks, and passes. The Upper Amu-Daria, especially in the neighbourhood of Kala-i-Vamar, shows a considerable difference from the Russian reconnaissances. For Kafiristan, Gilghit, and Astor, Colonel Tanner's surveys in 1878-83 have been used. The topography of South-Eastern Afghanistan—the country of the frontier tribes—has been based on the surveys and explorations of the Waziristan and Takht-i-Suliman expeditions by Major Holdich. The important surveys executed during the Afghan War, 1878-79, and continued during 1879-90 under Captain Holdich, have greatly improved our geographical knowledge of Afghanistan. In addition to these above-mentioned data, many other authorities have been consulted in the compilation of this map. For instance, the route-map of Lieut. North in 1841, Major Sir F. Goldsmith's route from Sistan to Mashad in 1872, the reconnaissance across the desert of Baluchistan by Colonel C. M. Macgregor, and Captain Lockwood in 1877, and routes furnished by the Quartermaster-General's Department, as well as the best maps of Persia and Afghanistan previously published by the Indian and Russian Governments. The map has been photozincographed at the Survey of India Office, Calcutta, and is, considering the process adopted, highly satisfactory.

AFRICA.

UPPER GUINEA.—Map to illustrate Mr. A. Millson's Paper on the Yoruba Country. Scale, 1 : 3,041,280.

Proceedings of the Royal Geographical Society, October 1891.

HINTERLAND VON KAMERUN, Karte der Reisen von Premierlieutnant Morgen im ——, in den Jahren 1889-91, in Verbindung mit einer Neukonstruktion der Routen der Kund'schen Expeditionen, 1887-89. Massstab, 1 : 1,000,000.

Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten. 1891. *Band* 4, *Tafel* VIII. *Berlin : A. Ascher and Co.*

GALLALÄNDERN, Dr. Anton Stecker's Reise in den——. Konstruiert und gezeichnet von G. E. Fritzsche. Massstab, 1 : 1,000,000.

Petermann's Geographische Mitteilungen, Jahrgang, 1891. *Tafel* 17. *Gotha : Justus Perthes.*

SOMALI LAND, Part of——, showing route of Lieut. Nurse from Dunkaraita to Bulhar, 1891. Scale 1 : 506,880.

Proceedings of the Royal Geographical Society, November 1891.

OSTHORN VON AFRIKA, Uebersicht über die Völkerlagerung am ——, nach dem gegenwärtigen Stande der Kenntnis. Von Prof. Dr. P. Paulitschke. Massstab, 1 : 4,000,000. *Mitteilungen der K. K. Geographischen Gesellschaft in Wien*, 1891. *No.* 9 *u.* 10. *Wien : R. Lechner's K. K. Hof-Buchhandlung.*

GERMAN EAST AFRICA, Routen-Skizze der v. Wissmann'schen Kilimandscharo Expedition, 1891. Nach dem Itinerar des Lieut. Heymons, unter Zugrundelegung der Aufnahmen von Lieut. von Höhnel und Dr. Hans Meyer. *Mitteil. von Forschungsreisenden u. Gelehrten aus den Deutschen Schutzgebieten*, 1891. *Band* 4, *Tafel* IX. *Berlin : A. Ascher and Co.*

VICTORIA NYANSA, Das Süd-West-Ufer des ——. Nach eigenen Routen-Aufnahmen und Positions-Bestimmungen gezeichnet von Pater Schynse. Massstab, 1 : 250,000. *Petermann's Geographische Mitteilungen, Jahrgang* 1891, *Tafel* 16. *Gotha : Justus Perthes.*

GAZA LAND, Map of ——, showing route taken by Mr. D. Doyle from Manica to the mouth of the Limpopo, 1891. Scale 1 : 2,534,400. *Proceedings of the Royal Geographical Society, October* 1891.

SOUTH AFRICA, Juta's Map of ——, from the Cape to the Zambesi. Compiled from the best available Colonial and Imperial information, including the official Cape Colony Map by the Surveyor-General, Cape Town, Dr. T. Hahn's *Damaraland* and F. C. Sellous' journals and sketches, etc. *Cape Town : J. C. Juta and Co.*

A new edition of Juta's widely-known Map of South Africa has again been published. It has always been considered a standard work of South African cartography, and the publishers deserve, therefore, credit for keeping this map up to date. All the new boundaries according to the latest treaties have been accurately laid down. Matabili- and Mashona-land show the results of the most recent surveys, and the forts and stations of the British South Africa Company are added. In the next edition we hope to see the Transvaal entirely re-drawn, and also the Orange Free State, after Jeppe's well-known publication. Where such considerable changes have taken place, as in the Transvaal, it is impossible to correct the old topographical features, and a new drawing becomes a necessity. The map will then be all that can be desired.

NEW ATLASES.

PHILIPS' HANDY VOLUME ATLAS OF LONDON. *London : George Philip and Son*, 32 *Fleet Street, E.C.*, 1891. *Price* 5*s.*

This little volume consists of maps of the whole of London and its surroundings, in fifty-five sections, on the scale of three inches to a mile. It is a most efficient guide, and we doubt if any one, however unacquainted with the metropolis, could fail to find his way about easily with this in his hand. One has only to turn to the plate of the neighbourhood one is in, and one's way is plain, for the streets are very clearly marked, and topographical features are brought out with colours. There are also maps showing the railways of London, its geology, etc., and various plans of buildings and gardens. A directory of public buildings, museums, theatres, hospitals, is included ; and there is a complete index of 11,500 streets, squares, parks, railway stations, etc. It would have been an advantage had hotels been included, but we suppose they were intentionally omitted, only the name of one being given.

HISTOIRE ET GÉOGRAPHIE, Atlas Vidal-Lablache, Maître de Conférences de Géographie à l'école normale supérieure. 10 Livraison. 24 Livraisons, 137 Cartes, 248 Cartons. *Paris : Armand Colin et Cie., Editeurs.*

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

Seventh Session, 1890-91.

The Council have the honour to submit the following Annual Report.

During the past Session a new impetus was given to the Society's work in consequence of the more commodious premises that have been secured in the National Portrait Gallery. The Society's Hall is now fully equipped with all the essential furniture and appliances; a Catalogue of the Lending and Reference Libraries has been issued to Members; and the collection of Maps, etc., is now being arranged and enlarged.

As might have been expected, the very large increase of Membership resulting from Mr. Stanley's Meetings in Scotland, when he addressed the Society at Edinburgh, Glasgow, Dundee, and Aberdeen, has not been fully maintained. It was foreseen that a certain proportion of the Members who were elected at that time would resign their Membership on the conclusion of the Session. Thus, of the 68 resignations during the past Session 32 were tendered by Members of the Society who were elected at the time of Mr. Stanley's visit. The balance of the decrease in the total Membership is accounted for by 28 Deaths and the 20 Members whose names were removed from the Roll in consequence of their subscriptions having been over three years in arrear.

The following Table exhibits the growth of the Society's Membership :—

	General Membership.					Society's Branches, &c.*				
Date.	Net Membership.	New Members.	Deaths, Resignations, or Defaulting Members.	Net increase or decrease of Membership.	Life Members.	Edinburgh.	Glasgow.	Dundee.	Aberdeen.	English and Foreign Members.
At 31st October 1885, . .	975	990	15	..	65	512	247	96	61	72
,, ,, 1886, . .	1069	153	55	+98	92	585	253	104	64	82
,, ,, 1887, . .	1102	129	96	+33	95	611	247	94	66	103
,, ,, 1888, . .	1144	129	87	+42	111	632	240	89	60	123
,, ,, 1889, . .	1160	114	98	+16	119	646	239	83	54	138
,, ,, 1890, . .	1574	517	103	+414	139	897	354	100	76	147
,, ,, 1891, . .	1495	37	116	−79	156	859	327	89	71	149

* These figures are taken from the Annual Reports, and show a small error in the first three Sessions in consequence of a few Members at the Society's Branches having been included at their request under more than one Branch.

Membership.

The following is a Statement of the Membership of the Society, as at 31st October 1891 :—

District.	Membership.
Edinburgh,	859
Glasgow,	327
Dundee,	89
Aberdeen,	71
England, Ireland, British Colonies, and Foreign Countries,	149
	1495

Of the above, 156 *are Life-Members.*

The following shows the decrease in the Society's Membership, due to the losses sustained through Deaths, Resignations, and the Defaulting Members whose names have been removed from the Roll :—

Membership at 31st October 1890,		1574
Members elected during Session 1890-91,		37
		1611
Deduct Deaths,	28	
,, Resignations,	68	
,, Defaulting Members,	20	
	—	116
Net Membership, 31st October 1891,		1495

The net decrease of Membership during the Session was therefore 79.

The Council are indebted to the Conveners, Honorary Secretaries, Treasurers and Members of the Local Committees in Glasgow, Dundee, and Aberdeen, for the services they have rendered by promoting the interests of the Society's Branches.

Diplomas of Fellowship.

Honorary Diplomas of Fellowship, in recognition of services rendered to the Society or to geographical science, were awarded by the Council to the following :— Mrs. Bishop (Isabella L. Bird); William C. Dunbar, Esq., C.B.; James M. Macandrew, Esq., C.A.

Diplomas of Fellowship were granted by the Council to the following Ordinary Members of the Society on their application :—A. W. Balderston, Esq.; James Beattie, Esq.; the Rev. James B. Eddie; David Scott Fergusson, Esq.; the Rev. John R. Fleming; Edwin G. Galletly, Esq.; Señor Julio Cuervo Marquez; Duncan Maclaren, Esq.; John Munro Macnab, Esq.; the Rev. F. G. Montagu Powell; Daniel J. Rankin, Esq.; the Rev. David Clement Scott; William Couper Tait, Esq.; and H. H. Thiele, Esq.

Finance.

The Council beg to submit the following Financial Statement :—

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 31*st October* 1890 *to* 31*st October* 1891.

FUNDS AT THE CLOSE OF LAST ACCOUNT:—			
£1000 Glasgow and South-Western Railway 4 per cent. Funded Debt, cost, 29th May 1885,		£1102 19 9	
Cash in Bank of Scotland—			
On Deposit Receipt, dated 15th August 1889,	£100 0 0		
,, Account Current at Glasgow, £345, 18s. 11d.; and at Edinburgh, £297, 14s. 4d.,	643 13 3		
	£743 13 3		
Add: Due by the Honorary Treasurer, £2 6 0			
Due by the Secretary, 9 0 5			
	11 6 5		
		754 19 8	
		£1857 19 5	
ENTRANCE FEES, 37 at £1, 1s.,	£38 17 0		
ORDINARY SUBSCRIPTIONS:—			
15 Life Members,	155 8 0		
1 Annual Subscription for 1885-86, £1 1 0			
2 Annual Subscriptions for 1886-87, 2 2 0			
3 Do. 1887-88, 3 3 0			
6 Do. 1888-89, 6 6 0			
57 Do. 1889-90, 59 17 0			
1232 Do. 1890-91, 1293 12 0			
11 Do. 1891-92, 11 11 0			
1 Do. 1892-93, 1 1 0			
	1378 13 0		
FEES received for Society's Diploma,	12 12 0		
SUMS received under the Society's Scheme for the encouragement of Geographical Education,	23 6 0		
PROCEEDS OF LECTURES in Edinburgh, Dundee, Aberdeen, and Glasgow,	7 10 0		
PROCEEDS OF MAGAZINES sold,	92 13 10		
DIVIDENDS and BANK INTEREST,	62 19 9		
RECEIPTS from Loan of Maps,	1 11 6		
		1773 11 1	
		£3631 10 6	

MAGAZINES, Printing, Paper, Lithographing, etc., from Nos. 8 to 12 of Vol. VI., and 1 to 7 of Vol. VII., all inclusive, and for Postages,		£816 18 7	
Less: Received during the year for Advertising,		60 0 0	
		£756 18 7	
GENERAL PRINTING,		68 10 1	
BOOKS and other Furnishings for Library,		45 13 6	
RENTS OF HALLS, and other expenses of Lectures,		122 4 5	
RENT OF SOCIETY'S HALL, Taxes and Gas, Repairs, Insurance, etc.,		127 0 2	
SALARIES:—			
To *Secretary*, year to 10th October 1891,	£300 0 0		
,, *Assistant Librarian and Clerks*,	168 14 0		
		468 14 0	
EXPENSES connected with Society's Education Scheme,		35 12 0	
MEDAL FUND,		39 10 0	
MISCELLANEOUS, including Stationery, Wages to Hall Porter, Messenger, General Expenses, Advertising, Cleaning, Bank Charges, Postages, and Office Furniture,		159 6 6	
FURTHER EXPENSES of Removal to New Premises in National Portrait Gallery,		58 12 1	
		£1882 1 4	
FUNDS AT CLOSE OF THIS ACCOUNT:			
£1000 Glasgow and South-Western Railway 4 per cent. Funded Debt, cost, 29th May 1885,	£1102 19 9		
£400 North British Railway 4 per cent. Consolidated Lien Stock, cost, 30th Dec. 1890,	496 2 0		
	£1599 1 9		
Cash in Bank of Scotland, Edinburgh, in Account Current, £138 17 11			
Due by Secretary, £12 6 6			
Less.—Due to Hon. Treasurer, 0 17 0			
	11 9 6		
	150 7 5		
		1749 9 2	
		£3631 10 6	

Edinburgh, 5th November 1891.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ending 31st October 1891, of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and find the same correct and sufficiently vouched.

pro JAS. M. MACANDREW, C.A.,
HUGH BLAIR, C.A.

The Expenditure for 1890-91 includes several exceptional items that are scarcely to be classed under the head of ordinary current expenditure. The following are the chief items:—(1) £50 for a special Magazine Grant, which, under arrangements that have been concluded, will be recouped by the Society next year; (2) £30, included in the Magazine Account, recoverable on sales of the Society's Magazine; (3) the outlay of £39, 10s. from the Medal Fund, towards which the Society received £95, 15s. 1d. from the Edinburgh International Exhibition; and (4) £58, 12s. 1d. on account of Removal Expenses from the Special Fund of £257, 4s., which was included in the last year's Financial Statement. The total of these items is £178, 2s. 1d., making the Ordinary Expenditure for the past year £1703, 19s. 3d.

The following Table exhibits the annual Balances of the Society since its foundation in 1884:—

Year to 31st October 1885,	.	.	.	£832	14 0
,, ,, 1886,	.	.	.	958	9 4
,, ,, 1887,	.	.	.	1110	7 11
,, ,, 1888,	.	.	.	1252	13 0
,, ,, 1889,	.	.	.	1344	10 2
,, ,, 1890,*	.	.	.	1857	19 5
,, ,, 1891,	.	.	.	1749	9 2

* The Accounts for the year 1890 included not only the exceptional receipts resulting from the visit of Mr. Stanley to Scotland, but also a sum of £257, 4s., already referred to as the Removal Fund, only a portion of which was expended.

Meetings of the Society.

The Society held 23 Meetings during the Session,—11 in Edinburgh (including the Annual Business Meeting, the Reception by the Council, and two Special Meetings), 6 in Glasgow, 3 in Dundee, and 3 in Aberdeen.

The papers read at these Meetings were contributed by:—Mr. E. G. Ravenstein (who delivered the Anniversary Address), Professor Douglas, Captain A. C. Yate, Dr. Carl Peters, the Rev. Dr. Stewart, Sir Charles Wilson, Mr. W. B. Blaikie, Professor Vambéry, and Mr. Dennis Doyle.

Education Scheme.

Dr. Mill's Course of Lectures on "The Earth and Man" in the early part of the year met with such gratifying success, and was so highly appreciated by teachers, that the Council, on the recommendation of the Education Committee, decided to promote similar Courses of Lectures, and to abandon the Examination Scheme.

The Council have pleasure in announcing that, during the Winter Session of 1891-92, two Courses of Lectures have been arranged. Taken together they cover the field of Physical Geography. The First Course will be delivered before Christmas by Professor James Geikie on "The Origin of Surface-Features." The Second Course will be given after Christmas by Dr. Hugh R. Mill on "Air and Sea: a Sketch of Meteorology and Oceanography."

In the opinion of the Council the best way to promote the sound teaching of Geography in schools is to enlighten the teachers, and that is one of the chief aims of the Educational Lectures promoted by the Society.

Scottish Geographical Magazine.

The Council, in approving of the manner in which the Magazine has been conducted, desire to express their recognition of the services of those who have contributed the signed articles and of the valuable aid accorded to the Editors by:—

J. G. Bartholomew, Esq. ; J. T. Bealby, Esq. ; Friedrich Bosse, Esq. ; Dr. James Burgess ; W. Scott Dalgleish, Esq. ; Colonel Dods ; Dr. Dods ; Dr. Robert W. Felkin ; John Geddie, Esq. ; John Gunn, Esq. ; Dr. Hugh R. Mill ; J. W. M'Crindle, Esq. ; Ralph Richardson, Esq. ; Charles Robertson, Esq. ; General Sir Robert M. Smith ; Coutts Trotter, Esq. ; and the Rev. W. Dundas Walker.

The Council are specially indebted to Dr. John Murray for the valuable and important papers which he has contributed to the Magazine.

Library and Map Departments.

A Classified Catalogue of the books in the Society's Library has been prepared by Mr. W. A. Taylor, the Assistant Librarian, with the assistance of Dr. Dods and Mr. George A. Craig ; and copies have lately been issued to Members. The number of books lent out last Session was 1173, as compared with 671 for the previous Session.

The following accessions were added to these Departments during the past Session : — Books and pamphlets, 598 ; periodicals, 114 ; atlases, 9 ; maps (sheets), 224.

The Council desire to record their indebtedness to the donors of books, maps, charts, and photographs. The various Colonial and Foreign Governments with whom the Society have relations continue to send their official publications as issued. Among private donors to the Library may be mentioned—Mr. W. B. Blaikie, Professor Emile Chaix, and Mr. John Cockburn. The Council are specially indebted to Mr. James Jackson, the Librarian of the Paris Geographical Society, for his gift of 430 Photographs—most of them mounted. These will form the basis of a Collection which it is intended to institute in the Map-room.

During the past Session the amount of money expended in purchases and library expenses was £25, 14s. 9d., and for binding, £19, 18s. 9d. ; making a total expenditure of £45, 13s. 6d.

Place-Names Committee.

A Committee of the Council has been appointed with the object of co-operating with the Director-General of the Ordnance Survey of the United Kingdom in the revision of Scottish Place-Names. Dr. James Burgess is the Convener.

Exploration.

The Society's scientific instruments, valued at £40, have again been lent to Mr. D. J. Rankin, who is continuing his explorations in the Loangwa-Zambezi basin.

For the Council,

ARTHUR SILVA WHITE,
Secretary.

Edinburgh, *5th November* 1891.

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